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DEPARTMENT OF THE ARMY FIELD MANUAL

SURVEILLANCE, TARGET ACQUISITION AND NIGHT OBSERVATION STANO DOCTRINE

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HEADQUARTERS, DEPARTMENT OF THE ARMY

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SURVEILLANCE, TARGET ACQUISITION, AND NIGHT OBSERVATION (STANO) DOCTRINE

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CHAPTER 1

INTRODUCTION

1-1. Purpose

a. The purpose of this manual is to provide, in a single document, the general doctrine required for operation of the surveillance, target acquisition, and night observation (STANO) system in the Army-in-the-field. It provides guidance for commanders and staffs in the field and for the preparation of other doctrinal, technical, and applicatory manuals.

b. This document is a field manual (Test) as defined in AR 310-3. It is for the dissemination and promulgation of doctrine having interim approval and required in the field prior to final approval by Department of the Army.

1-2. Scope

a. This manual addresses information collection activities, both ground and aerial, involving the employment of sensors in combat surveillance, target acquisition and reconnaissance roles to find the enemy on the ground in a combat environment. The manual also addresses doctrine for the employment of devices to improve the general observation capabilities of combat forces during periods of reduced visibility.

b. This manual includes both existing and interim STANO doctrine. It presents STANO doctrine

in a broad sense, and provides references to other manuals which contain more detailed STANO doctrine.

c. Although this manual contains information regarding certain interfacing or associated collection activities (e.g., signal intelligence/electronic warfare support measures (SIGINT/ESM) and human intelligence (HUMINT)), it does not address such activities in detail. The appropriate field manuals should be consulted for more definitive information (appendix A).

d. The contents of this manual are applicable to general war, limited war, and cold war situations, to include stability operations, in both nuclear and non-nuclear warfare environments.

e. Users of this manual are encouraged to submit recommended changes and comments to improve the manual. Comments should be keyed to the specific page, paragraph, and line of text in which the change is recommended. Reasons will be provided for each comment to insure understanding and complete evaluation. Comments should be prepared using DA Form 2028 (Recommended Changes to Publications) and forwarded direct to the Commanding Officer, U.S. Army Combat Developments Command, Institute of Special Studies, Fort Belvoir, Virginia 22060.



CHAPTER 2

STANO FUNCTIONS

Section I. INTRODUCTION

2-1. The STANO System

The STANO system is comprised of those means and materiel organic to or in support of the Army in the field (to include other Services) associated with information gathering and presentation capabilities utilized to find the enemy or facilitate night operations.

2-2. General

a. Surveillance, target acquisition and night observation (STANO) functions encompass all activities dedicated to obtaining information on the enemy as required by combat commanders for the planning and execution of their combat operations. In addition to treating the information collection functions of the Army in the field, this chapter also addresses the application of STANO capabilities to improving the mobility, firepower, and command and control effectiveness of combat forces operating under conditions of reduced visibility.

b. Although STANO functions are addressed as separate and distinct activities in this chapter, it must be realized that they cannot be so treated in actual practice. The means employed to accomplish the different functions are often identi-

cal, with the distinction between functions being dependent on the intended application of the information being collected.

(1) Combat surveillance, as an information collecting function, is accomplished as an integral part of all combat operations to include reconnaissance and security operations. The distinction between surveillance and reconnaissance rests upon a difference in scope and direction. A reconnaissance mission is finite in scope and time and has specific intelligence objectives. Combat surveillance by definition is a continuous watch over the battle area and does not focus on a specific objective.

(2) The combat intelligence function of the field army results in two basic intelligence products: decision-oriented intelligence and target intelligence. The force commander employs decision-oriented intelligence in the design and execution of maneuver, and target intelligence in the application of firepower. Both types of intelligence emerge from the same broad collection effort of the combat intelligence function, but target intelligence poses more exacting requirements for accuracy and timeliness. Herein lies the primary distinction between combat surveillance and target acquisition.

Section II. COMBAT SURVEILLANCE

2-3. General

Surveillance involves the systematic and continuous observation of the battlefield to include selected areas, routes, or static locations such as crossroads, bridges, aircraft landing areas, or other specific type installations. Factors influencing surveillance are visibility, terrain, natural or manmade concealment, enemy air defense capabilities against surveillance by aerial means, other enemy countermeasures, and the capabilities of the surveillance equipment available. Surveillance conducted as an inherent part of reconnaissance and security missions provides

commanders with current information by maintaining a systematic watch over the assigned area for the purpose of detecting, locating, identifying, and reporting information of military value. Surveillance may be categorized as follows:

a. Ground surveillance is characterized by generally severe line-of-sight limitations, dependence upon terrain for movement routes and site locations, and a generally inadequate capability of surface transport to displace surveillance means in time to be responsive to immediate requirements in new areas. These limitations

notwithstanding, ground surveillance is essential to an all weather, day and night watch over the battle area.

b. Aerial surveillance is characterized by a capability to extend line-of-sight to become independent from terrain for communications, movement routes and site locations, and to adjust to new requirements rapidly. The mobility of aerial surveillance platforms and their ability to operate free of terrain interference provide a capability to conduct surveillance over large areas. Generally, visibility restrictions and inclement weather will reduce the effectiveness of aerial surveillance. Problems of coordination and control of the use of the airspace may impose further limitations on the use of aerial surveillance. When aerial surveillance is limited, other means must continue sensory contact with the enemy.

2-4. Types of Surveillance

a. *Visual.* Visual surveillance is accomplished by aviation or ground units as an included task in the conduct of combat operations. Reports of an immediate nature are relayed by radio through intelligence or command channels depending on the channel established by the applicable operation order.

b. *Electronic.* Electronic surveillance involves the use of ground radar, image intensification devices, infrared devices, unattended ground sensors, and airborne radar and infrared sensors. Information secured by use of the ground devices is reported in the same manner as visual surveillance reports. Airborne sensors provide immediate intelligence reports over an appropriate radio net or may transmit data from the aircraft to a ground data terminal directly via data link equipment for rapid processing and evaluation. For more detailed information see FM 30-20.

c. *Photographic.* Aerial photo coverage is performed by Army aviation and other service air units. For information on requesting photo coverage, see FM 30-20. Photo coverage by air cavalry units performing surveillance missions usually is limited to handheld or special mounted cameras operated from organic aircraft.

d. *SIGINT/ESM.* SIGINT/ESM is performed by specialized Army EW/Cryptologic units (and other Army units where applicable). Normally the means utilized to exploit electromagnetic emissions are capable of all-weather day and night operations and may locate and identify emitters and emitter-associated targets, develop

enemy radio and radar order of battle, and (especially through COMINT) provide unique insights into enemy intentions, activities and situations.

2-5. Fundamentals of Surveillance

a. Orient on assigned area.

b. Maintain continuous and systematic observation of the area.

c. Report all information of activity, or lack of activity, within the area accurately and rapidly.

d. Avoid engagement with the enemy except in self-defense.

2-6. Combat Surveillance Planning

a. Combat surveillance is under the staff supervision of the intelligence officer at all echelons. The G2, in coordination with G3, assigns mission priorities similar to that for processing reconnaissance requests.

b. The G2 has the primary general staff responsibility for—

(1) Planning the systematic watch of the battle area.

(2) Assigning mission priorities in coordination with the G3.

(3) Coordinating and integrating all surveillance activities.

(4) Developing intelligence from the information that is acquired.

(5) Furnishing to users the resultant intelligence data.

c. The G3 has the primary general staff responsibility for—

(1) Designating units for conduct of surveillance in accordance with the mission priorities established by G2.

(2) Furnishing information on friendly forces, to include their location, activities, and plans.

(3) Procuring information required for damage assessment.

d. All surveillance means are integrated to provide for their effective application and coordinated use in covering the commander's area of influence. This is particularly necessary in view of the ever-increasing enemy capabilities to deny use of the airspace and to impair or to deny use of electronic detection and communications devices.

e. In assigning orders and requests for specific information, the capabilities of the surveillance means available to collecting agencies are considered in the same manner as the capabilities of other collection means. When the desired use of subordinate unit collection means is incompatible with the assigned mission of the unit to which the means belong, then the lowest subordinate headquarters controlling the means may be placed under the higher commander's control. For example, if the mission assigned to a division armored cavalry squadron does not permit use of certain ground radars of the squadron, as desired by the division commander, the particular radar unit may be temporarily placed under division control.

f. Detailed control, coordination, and supervision are necessary to guard against gaps or similar deficiencies in the combat surveillance coverage of the area of interest. Provisions are made for inspections, reports, maintenance of patrols, reconnaissance and surveillance plans, and surveillance capability overlays.

2-7. Ground Surveillance

Ground surveillance involves the systematic and continuous observation, from the ground, of selected areas, routes, or static locations such as crossroads, bridges, aircraft landing areas, or other specific type installations. Factors influencing surveillance are visibility, terrain, natural or manmade concealment, enemy activity, and types of surveillance equipment. Units performing ground surveillance missions provide commanders with current information by keeping a systematic watch over the assigned surveillance area for the purpose of detecting, locating, identifying, and reporting information of military value. Ground surveillance is conducted in each combat operation by all combat units.

a. *Surveillance Operations.* When planning surveillance operations, the factors of mission, enemy, terrain and weather, and troops available (METT) will govern the organization and disposition of forces. Since surveillance consists of systematic and continuous observation of large areas, long routes, or several specific locations, units conducting surveillance missions normally commit the bulk of their forces to performing observation while retaining a small reserve to assist elements that may be attacked by enemy forces. Ground units performing a surveillance mission will usually operate in rear areas, areas adjacent to the FEBA, or provide dismounted

elements which will be airlifted into areas forward of the FEBA. Surveillance missions are conducted in a manner similar to that of a screening force or a rear area security operation. Observation posts, listening posts, and patrols are established to provide continuous and systematic observation. A surveillance force is not usually capable of offering strong resistance to the enemy; however, it must be capable of protecting itself. Air cavalry units extend the surveillance capabilities of ground units. When air cavalry units are performing surveillance missions forward of the FEBA, commanders must give careful consideration to enemy antiaircraft capabilities.

b. *Surveillance Tasks.* As previously stated any unit or organization may be assigned a surveillance mission. Surveillance is routinely performed by units as a part of normal combat operations. Surveillance tasks which may be performed while conducting other primary missions are—

(1) Determination by observation of militarily significant activity (by the enemy or civilians influenced by the enemy) or the absence of such activity.

(2) Location of targets for employment of airstrikes, artillery, or chemical or nuclear fires within assigned areas.

(3) Observation and control of organic and nonorganic indirect and aerially delivered supporting fires.

(4) Damage assessment.

(5) Location and identification of enemy units—moving or stationary—within assigned areas of operations.

(6) Observation of likely avenues of enemy approach and lines of communication.

(7) Observation of routes and key terrain within friendly rear areas.

c. In rear area surveillance, the unit (or its elements) occupies vantage points to observe and report any unusual activity within the area. Because of the size of the area under surveillance, the operation normally is limited to establishment of observation or listening posts. Patrolling of routes is not normally included within the surveillance task although the manning of roadblocks on major routes may be. As an integrated task in the rear area security mission, patrolling is usually included. Surveillance is passive. When more active operations are required by the enemy situation, the area of troop responsibility is reduced. Except for the consideration of larger areas and the absence of patrolling, the techni-

ques and considerations of rear area security apply.

2-8. Aerial Surveillance

Aerial surveillance is the systematic observation, from the air, of surface and air areas to obtain information to be processed into intelligence. Aerial surveillance missions provide the supported commander with current information by keeping a systematic and repeated watch over a well defined area for the purpose of detecting, identifying, locating, and reporting any information of military value.

a. Aerial Surveillance Missions. An aerial surveillance mission is usually characterized by the large expanse of terrain that it covers and the repetitiousness with which it is flown. Aerial surveillance is continuous over the entire battlefield or area of interest to the extent that resources will allow. Generally it is conducted without regard to specific targets though major areas of interest may be emphasized. A surveillance mission normally is performed using a large area coverage sensor such as radar, or by visual observation or photographic coverage from higher altitudes so that a large ground area can be observed at all times. The majority of aerial surveillance missions will be flown on a repetitive basis, with individual flights overlapping to insure complete coverage of the area. Radar, and some photographic and visual surveillance flights can be flown along or behind the forward edge of the battle area (FEBA) parallel to the line of contact. Surveillance over-flights of enemy occupied areas are also employed using all surveillance capabilities mentioned, when required. The major advantages of aerial surveillance missions are their ability to—

(1) Cover large expanses of terrain rapidly and continuously, with the minimum expenditure of aircraft and sensor capabilities.

(2) Maintain continuous surveillance over the entire area while flying over friendly positions, which increases the capability for aircraft to complete successfully the mission and return safely.

(3) Communicate easily on a real time basis to their control center.

(4) Observe movement or changes as they take place on the enemy side of the FEBA which will provide the commander with an early warning of possible enemy intentions and identify specific target areas for further observation by either aerial or ground reconnaissance resources.

b. Collection Means.

(1) Organic Army aerial collection means include airplanes, helicopters, pilots, aerial observers, sensors, and sensor equipment operators which can collect information from aerial platforms out to the operational limits of the aircraft or sensors. Present collection capabilities include visual observation, photography, radar, imaging, and electronic surveillance.

(2) Other services, principally the Air Force but also the Navy and Marine Corps, when included as part of a joint operation, provide the aerial collection means required to increase the area of coverage capabilities of the Army and extend that coverage beyond the limits of organic Army aerial collection means. Present collection capabilities include visual observation, photography, radar and infrared imagery, radar mapping, electronic reconnaissance, and weather reconnaissance.

(3) Other governmental agencies may supplement the collection means mentioned above.

c. Collection Agencies.

(1) The aviation aerial surveillance company is a specialized organization containing Army aircraft and various types of sensors. The company provides the Army with an organic means of procuring intelligence information in immediate response to the commander's needs.

(2) The military intelligence battalion, air reconnaissance support (MIBARS), field army, is a specialized organization created to provide the Army an organic means of interpreting, processing, and disseminating intelligence information from aerial reconnaissance missions flown by the Air Force or other services in support of the Army's requirements. It also provides liaison officers to the reconnaissance elements of the supporting services.

(3) Contained within the military intelligence organization supporting the field army, corps, division, separate brigade, and armored cavalry regiment are imagery interpretation (II) sections that directly support their respective headquarters G2 or S2 staff section. This II support is immediately responsive to the commander's needs and can provide all II functions.

(4) The ASA provides tactical units to conduct the electronic warfare (EW) portion of aerial reconnaissance and surveillance operations in support of Army field commands. Electronic Warfare Support Measures (ESM), Signal Intelligence (SIGINT), and the Electronic Counter-

Countermeasures (ECCM) operations will be immediately responsive to the commander's needs. A detailed discussion of the U.S. Army Security Agency EW functions is contained in FM 32-20. A detailed discussion of other ASA functions, its tactical organization, employment, control, and command relationship is contained in FM 32-10.

d. Aerial Surveillance Intelligence Cycle.

(1) *General.* The aerial reconnaissance/surveillance intelligence cycle (fig. 2-1) is based on the determination of a specific requirement for information and the action necessary to fulfill the requirement at any echelon of command. The G2 Air may initiate a requirement, or he may receive it from another staff section or from a subordinate unit. As the G2 Air, he is the staff supervisor of the request until action upon it has been completed and the originator has been so advised. At each echelon the G2 Air action sequence follows a similar pattern. Variations at each echelon involve personnel, equipment, and administrative detail, but the same thought process and sequence of action are used. Close staff coordination with supporting units must be accomplished by the G2 Air to obtain maximum return from the effort expended. Development of a specific unit SOP will facilitate and expedite the performance of these functions.

(2) *Field Army and Independent Corps Aerial Surveillance Intelligence Cycle.* The G2 Air at field army level normally will perform as a staff supervisor and coordinator of the aerial surveillance and reconnaissance effort of the field army. Normally he will process only those requests which originate at field army level or those which cannot be accomplished at corps level and below and are forwarded to field army for execution.

(a) *Air request control.* Requests received or originated at field army are approved by the G2 Air. Upon approval of each request, a priority is established. An approved request may be accomplished by organic means or forwarded to TAF (TACC). Close coordination between the G2 Air and TACC is necessary to determine the priority in which requests are accomplished by the Air Force. When the TACC designates a unit to fly the mission, the G2 Air is notified. The G2 Air then furnishes the MIBARS with the detailed mission information.

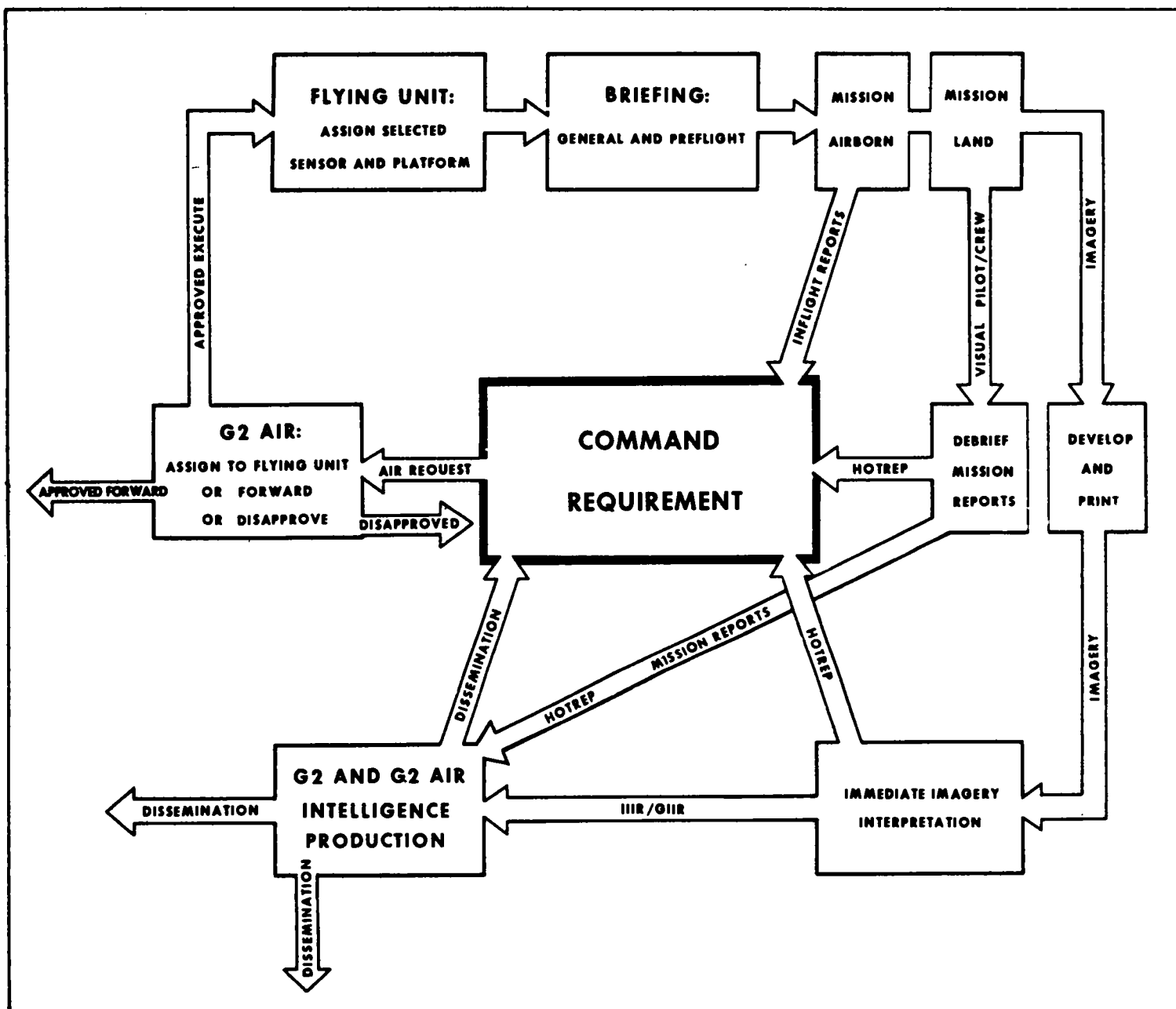
(b) *Mission accomplishment.* Once the requirement is furnished the MIBARS, the actions to coordinate, receive, and interpret the re-

sultant imagery are the responsibilities of the Army element even though the mission is flown by an Air Force element. The procedures employed by the MIBARS to complete the collection of intelligence information are covered in FM 30-20.

(c) *Intelligence production and dissemination.* The field army G2 Air directs and supervises the production and dissemination of intelligence information resulting from aerial reconnaissance or surveillance missions. He insures that the information is forwarded to the requesting unit and other appropriate activities and the field Army G2 to permit its integration with other intelligence information available to the G2.

(3) *Corps Aerial Surveillance Intelligence Cycle.* The aerial surveillance intelligence cycle at corps is comparable to that of the field army. The corps normally has Air Force reconnaissance missions allocated to accomplish immediate aerial surveillance and reconnaissance missions only. The G2 Air at corps develops his aerial collection plan based on the corps commander's requirements and the integration of approved requests received from subordinate elements. The G2 Air determines which missions can be accomplished by organic Army aircraft and assigns them to the corps aviation aerial surveillance company for accomplishment. Preplanned missions requiring Air Force support are forwarded to the G2 Air at field army for approval and incorporation into the field army surveillance plan. Immediate missions requiring Air Force support are coordinated with the DASC at corps and accomplished as part of the immediate missions allocated to the corps. The production and dissemination of the resultant intelligence are similar to those procedures used in the field army aerial surveillance intelligence cycle.

(4) *Division Aerial Surveillance Intelligence Cycle.* The aerial surveillance intelligence cycle at division is similar to that at corps. To the maximum extent possible, the division G2 Air attempts to accomplish requests from subordinate elements using his organic capabilities (e.g., visual aerial surveillance for all divisions, the aerial surveillance platoon in the airmobile division). When this is not possible, he incorporates approved requests into the division surveillance plan which is forwarded to corps for approval and accomplishment within the resources of higher headquarters. Division missions flown by organic corps aircraft are coordinated beforehand so that data terminals and division imagery



interpretation support may be alerted to receive the results of the mission as it is flown and the results processed and interpreted. Processing of data terminal IR film can be accomplished by the mobile reproduction laboratory of the imagery interpretation section.

(5) *Aerial Surveillance Intelligence Cycle*

Section III. RECONNAISSANCE

2-9. General

a. Reconnaissance is the directed effort in the field to collect information of the enemy and the area of operations by ground and air activities. This information is classified under the headings of enemy, terrain, weather, and enemy's resources.

b. The purpose of reconnaissance is to obtain combat information of the enemy and the area of operations for the production of combat intelligence. The combat intelligence produced is used by the commander in planning and conducting combat operations. Reconnaissance information and the resulting combat intelligence seek to reduce the unknown aspects of the enemy and the area of operations and contribute to the accuracy of evaluating risks involved and the successful application of combat power. Detailed discussions of reconnaissance may be found in FM 5-36, 17-() series, 30-20, and 31-36.

c. Reconnaissance may be subdivided into ground reconnaissance and aerial reconnaissance. Ground reconnaissance can produce detailed information of the enemy and area of operations, but the range and timeliness of the ground reconnaissance effort is limited by its ground mobility. Aerial reconnaissance has a greater capability for range and timeliness, due to its air mobility, but the information gathered is more general in nature. Both forms of reconnaissance are conducted in accordance with the same fundamentals.

2-10. Fundamentals of Reconnaissance

a. *Orient movement on the objective.* Units performing reconnaissance orient their movement on the objective. The objective may be enemy troops, a locality, or a terrain feature based upon the mission. When the objective is enemy troops, the friendly unit maneuvers according to the static location or movement of the enemy.

b. *Report all information.* All information, positive and negative, obtained during the performance of a reconnaissance mission should be

for Other Units. The pattern for obtaining information through the use of aerial vehicles is similar at all echelons having organic aerial surveillance vehicles. Units without aerial surveillance means submit requests to the next higher echelon for appropriate action.

reported regardless of its apparent value. All reports must be accurate and answer the questions what, when, where, how many, and doing what? Reports must be transmitted rapidly if the information is to be of value.

c. *Avoid decisive engagement.* Reconnaissance elements secure information without engaging the enemy when possible, but they fight when necessary to accomplish the mission. A unit must not become engaged to the point where the accomplishment of the reconnaissance mission is jeopardized.

d. *Maintain contact with the enemy.* Contact with the enemy is established as soon as possible. Once contact has been made, every effort is made to maintain it, either physically or visually. A unit does not voluntarily break contact with the enemy unless ordered to do so by higher headquarters.

e. *Develop the situation.* When enemy contact is made or an obstacle is encountered, the situation must be developed quickly. The enemy's location, strength, composition, and disposition must be determined; a special effort must be made to determine the flanks of his position. A decision to attack or bypass the position must be reached quickly.

2-11. Planning and Coordinating Reconnaissance Activities

a. The intelligence officer plans and coordinates reconnaissance activities with the operations officer and consults with the entire staff to insure coordination of reconnaissance with other activities. Several factors should be taken into consideration in the planning stage. These include the formulation of the plan itself, the selection of a unit, and coordination. In preparing the plan, broad generalizations such as "report strength and disposition of the enemy" are to be avoided. The specific time that the information is desired, or the latest time that the information will be of value, should be included in the order or request. Where more than one mission is assigned to a unit, definite priorities should be stated. Plans

should include provisions for debriefing of participating personnel after the reconnaissance has been completed.

b. Once a unit is selected, in coordination with the operations officer, the unit should be allowed sufficient time to prepare its own plans, to conduct the mission, and to report the results. The assigned mission should be within the capability of the reconnaissance agency.

c. The intelligence officer also should coordinate reconnaissance activities with other staff members. Adjacent and supporting units are also informed of reconnaissance plans to preclude duplication of reconnaissance efforts. Coordination is of major importance in the accomplishment of night reconnaissance missions.

2-12. Types of Reconnaissance Missions

a. *Route reconnaissance.* Route reconnaissance is the directed effort to obtain information of the route, obstacles including chemical or radiological contamination, enemy, and the adjacent terrain along a specific route which, if occupied by the enemy, would affect movement along the route.

b. *Zone reconnaissance.* Zone reconnaissance is the directed effort to obtain detailed information of all routes, obstacles including chemical or radiological contamination, terrain, and enemy forces within a zone defined by boundaries.

c. *Area reconnaissance.* Area reconnaissance is the directed effort to obtain detailed information of all routes, obstacles including chemical or radiological contamination, terrain, and enemy forces within a specific and clearly defined area.

Section IV. TARGET ACQUISITION

2-15. General

a. Target acquisition is that part of combat intelligence which involves accurate and timely detection, identification, and location of ground targets for the purpose of target analysis and the effective employment of weapons. Target acquisition results from applying information collected from all sources and agencies to a specific purpose.

b. Detection determines the existence or presence of a target. Identification determines the nature, composition, and size of the target. Location consists of determining the position of the

2-13. Reconnaissance Instructions

Instructions for reconnaissance units must be complete and include exactly what combat information is to be obtained, the time by which the information must be reported, where the information is to be sought, and when the mission is to be executed. Essential details may include—

- a. Pertinent information of the enemy and friendly troops.
- b. Plans of the higher commander.
- c. Specific information desired.
- d. Zone, area, or route to be reconnoitered.
- e. When, where, and how information is to be reported to the higher commander.
- f. Time of departure.
- g. Appropriate control measures.
- h. Action to be taken when mission is completed.

2-14. Reconnaissance at Night

Ground reconnaissance operations are slower and less effective at night. They are usually limited to dismounted patrolling, observation of routes, and the use of listening posts. Only against very light resistance and with favorable terrain and routes of advance can vehicular reconnaissance be used without being preceded by dismounted patrols. Night aerial reconnaissance may supplement ground reconnaissance. Darkness restricts the acquisition of information by visual means, but the probability that the enemy will rely on darkness to conceal his movements, coupled with our capability for the employment of electronic sensors and night observation devices, makes night aerial reconnaissance an important information gathering activity.

target with respect to known points or weapons (i.e., with respect to a common grid).

c. The principal objective of the target acquisition effort is to employ predicted fire techniques to achieve first round effectiveness. The effectiveness of the fire on a target will depend largely upon the accuracy, completeness, and timeliness of target acquisition.

2-16. Requirements for Detail and Accuracy

Target intelligence must be sufficiently detailed to permit an evaluation of the target's importance in relation to the mission of the command and to

permit analysis to determine the most effective weapon or warhead for use against the target. Collection agencies must be impressed with the requirement to provide complete and accurate target information in order to satisfy the needs of specific users.

a. Requirements for detail and accuracy will vary with the weapon to be employed (e.g., air, artillery, maneuver force), the type munition (e.g., HE, chemical, or nuclear), the type fire (e.g., indirect or direct, unobserved or observed) and the effect desired (e.g., neutralization, destruction, harassment). Conversely, the detail and accuracy furnished by target acquisition means will, in turn, have an influence on each of these variables.

b. For the above reason, it must be stressed that target information/intelligence must be reported as completely and accurately as possible in consonance with the capabilities of the acquisition source, timeliness requirements, and the existing situation. This is not to imply that incomplete information should not be reported. On the contrary, it plays a major role in target acquisition. For example, the artillery continually stresses the requirement for the location of a target to be given in three dimensional coordinates (x=easting, y=northing, z=altitude). However, the altitude (z) is, more often than not, provided by the fire direction agency from the map rather than by the target acquisition means. Further, the report of vehicles entering and leaving a wooded area may be sufficient information to confirm the location of a previously suspected target.

2-17. Requirements for Timeliness

Timeliness in acquiring targets is absolutely essential since the enemy will try to avoid presenting lucrative targets, and those presented will be made as transitory as possible.

a. Requirements for timeliness vary. Several factors to be considered include the weapons to be employed, operational plans and the nature of the target (i.e., whether it is permanent, semi-permanent or mobile; whether it is building up or dispersing; and whether it is an immediate or future threat to the accomplishment of the mission).

b. To insure timeliness in target acquisition, all commands and target acquisition agencies must be authorized to report information directly to whatever agency has the capability to react rapidly. Every effort should be made to prevent any unnecessary delay in reporting target infor-

mation/intelligence. Delays are created by excessive intelligence processing or the use of circuitous reporting channels without regard for timeliness.

c. Highly accurate target information/intelligence is particularly valuable for general intelligence purposes. Thus, information acquired by target acquisition, though obtained primarily for use in the attack of targets, should receive thorough consideration for dissemination to higher, lower, and adjacent commands.

d. The formulation of orders and requests are particularly important to a successful target acquisition effort.

2-18. Direct Target Acquisition

a. Traditionally, direct target acquisition has been thought to be accomplished only by the application of means designed for that purpose (e.g., forward observers, observation posts, aerial observers, countermortar/battery and surveillance radars, and flash and sound ranging devices). These means are an integral part of the artillery fire support system and are designed to be employed specifically to acquire targets for the artillery and other fire support means. Implicit in the application of these means is the requirement for a high degree of accuracy, sufficient information for target analysis (i.e., if and when to engage target, by what method or means and by whom) and immediate response when required (see FM 6-121).

b. Direct target acquisition can be, and is, accomplished by other means (e.g., by units in contact, ground surveillance radars, night vision devices, searchlights, unattended ground sensors, airborne personnel detectors, patrols of all types, survey parties, imagery acquired by aerial means, signal intelligence and electronic warfare support measures, ground and air reconnaissance elements and virtually anyone who sees a target and has the capability to communicate the required information to a reaction means). Additionally, at times many of these means will be given the specific mission to acquire targets (e.g., long range patrols, aerial imagery, or surveillance radars which have been surveyed into the common grid). Although all the various means are not formally organized into a recognizable target acquisition system, they play an extremely important part in target acquisition.

2-19. Target Development

a. Target development, sometimes termed Indirect Target Acquisition, is the detection, loca-

tion, and identification of suspect, probable and/or confirmed targets through the process of analyzing and correlating information from all intelligence collection means. Targets so located may provide the basis for further directing the collection effort, planning operations, committing maneuver forces, executing harassing and interdicting fires and/or attacking (immediately or preplanned) by fire support means. The development process is one of continuous refinement of detail (i.e., it may progress from a suspect target located only generally, through successive stages until a confirmed target is located accurately and identified exactly).

b. Target development differs from direct target acquisition, not in the end results attained or sought, but in the manner of achieving the end result. It is a unique aspect of normal intelligence production with the specific purpose to develop targets. The force intelligence officer must not only accept staff responsibility for this function, but he must actively participate and coordinate the effort to insure its efficient and meaningful operation.

c. Force commanders must provide resources to accomplish this important function. Intelligence personnel and fire support personnel charged with this function should be collocated and their efforts and unique capabilities integrated. This will facilitate the free flow and rapid exchange of information. It will also insure that pertinent targeting information is not delayed or derogated by other intelligence information which may be of equal importance but not as perishable.

2-20. Target Acquisition Planning

a. Early in the planning stage of an operation, a list of potential targets is developed. Such factors as mission, information on the enemy, characteristics of the area of operations, and enemy tactics and practices are studied to select areas in which targets are probable.

b. The collection effort provides systematic combat surveillance to detect targets. Areas of particular importance to operational plans are subject to more intensive surveillance than other areas. Target folders should be developed and maintained by inclusion of target intelligence and other material related to planning and executing action against a specific target.

c. The target acquisition effort is then directed toward securing information to verify, identify, accurately locate, or disprove the presence of suspected targets. This is accomplished by assigning suitable collection tasks to collection agencies.

d. The collection plan, observation plans, air reconnaissance plans, and patrol plans are used to assist in coordinating the target acquisition effort.

2-21. Coordination and Processing of Target Acquisition

a. Artillery target acquisition agencies are part of the intelligence-gathering agencies of the force and, as such, are a major component of the combat intelligence system at all echelons. The force G2 (or S2), in developing his collection plan, makes full use of artillery agencies in collecting combat intelligence. The discharge of this responsibility is furthered by the artillery's extensive communication system, target acquisition equipment, and ability to coordinate numerous observers. The primary function of the artillery target acquisition means is the gathering and reporting of target information of importance to artillery operations in support of the combat force.

b. Environmental conditions impose a wide and varying range of limitations which has a particular effect on every target acquisition means employed. In order to insure continuity of the target acquisition effort, there must always be supplemental target acquisition means available in case other means are degraded because of the predominance of certain environmental conditions.

c. The techniques involved in the processing of target acquisition data are extremely important in establishing the degree of responsiveness with which targets can be engaged. Targets capable of displacing rapidly and/or imposing a serious and immediate threat to the security of friendly forces must be engaged as soon as possible after they have been acquired. Target acquisition means are limited in the time they can locate targets by the operational characteristics of each device employed. Normally, these time factors do not constitute a responsiveness problem in themselves. Degradation of responsiveness is caused by the time consumed in the transmission and processing of target acquisition data between the acquisition source and the unit selected to engage the target. All possible measures must be instituted to reduce to a minimum the time required to transmit and process target acquisition data.

2-22. Signal Intelligence and Electronic Warfare Support Measures

Signal intelligence (SIGINT) and electronic war-

fare support measures (ESM) extend the depth of intelligence operations and contribute to long-range target acquisition. SIGINT information

can confirm, and, in many instances, alert other target acquisition activities. These activities are capable of all-weather, day and night operation.

Section V. NIGHT OBSERVATION

2-23. General

a. Heretofore all combat operations (e.g., attack, defense, retrograde) and combat associated activities (intelligence gathering, firepower coordination, movement, combat preparation) performed during periods of darkness or reduced visibility were treated as a special operation due to individual or unit limitations imposed by reduced visibility. The degree to which these limitations can be offset or removed is based almost entirely on how much added ability is gained by the proficient employment of night observation aids such as battlefield illumination, night vision devices, and radars to accomplish assigned tasks. Fundamentally these tasks require the soldier to move, observe terrain, observe enemy and friendly elements, aim and fire weapons while observing their effects, assist communication, and perform other tasks associated with the unit's mission. Depending upon the circumstances under which they are employed, the use of night observation aids during the hours of reduced visibility will improve some tactical capabilities more than others. Those aids, when employed to their best advantage, will facilitate the accomplishment of an individual task or unit mission.

b. Without the capability for night observation, the commander is severely handicapped by his unit's limited ability to move, shoot, perform reconnaissance, or acquire targets. Current illumination, night vision aids and surveillance aids increase the capability to perform the fundamentals of combat during periods of limited visibility. These aids provide the capability to exploit the advantages of darkness while surpassing and countering the enemy's capabilities to operate at night.

2-24. Requirements

The principal requirement for night observation aids is to overcome the limitations imposed on friendly forces by reduced visibility. Those aids should be used in such a manner as to give daylight or near-daylight capability to friendly forces while impeding the enemy, or giving him as little assistance as possible. The requirements for night observation originate with the needs of an individual, a patrol, or a squad, and progress

in increasing magnitude to the requirements for the battalion. The requirements are to—

a. Produce a night vision advantage for friendly troops.

b. Detect, identify, and engage enemy elements within the friendly unit's area of influence.

c. Enable aircraft to perform their missions during darkness, to include helicopter delivered direct aerial support and Air force tactical close air support.

d. Enable combat support and combat service support operations to be carried out more effectively during darkness.

e. Enable mounted and dismounted troops to move and navigate during darkness with near-daylight speed and accuracy.

f. Detect enemy ambushes and increase the effectiveness of friendly ambush operations during darkness.

2-25. Battlefield Illumination

The purpose of battlefield illumination is to provide sufficient light for friendly forces to conduct operations during periods of darkness. Proper use of illumination permits more effective execution of night offensive and defensive operations; makes possible better coordination and control of attacking elements; facilitates the organization of defensive positions and the conduct of the defense; permits maintenance, repair, recovery, and equipment evacuation; and promotes troop confidence and morale. The employment of illumination is favorable for nuclear-supported night attacks because the consideration of secrecy is normally eliminated by the nuclear attack, and the use of illumination will facilitate a more rapid exploitation. Conversely, the employment of battlefield illumination, other than subdued or non-visible light, can negate the advantage attainable through the use of night vision devices.

a. *Direct Illumination.* Direct illumination is provided by light from pyrotechnics or searchlights. The intensity of light provided by direct illumination varies according to the source of illumination.

b. *Indirect Illumination.* Indirect illumination (artificial moonlight) is a type of battlefield illumination obtained by employing artillery, tank

or airborne searchlights using diffusion or reflection techniques.

2-26. Night Vision Devices

A variety of night vision devices are available to the individual soldier. The two categories currently available are active and passive.

a. Active Devices. These devices include a means of illuminating the target; usually by infrared radiation. The observation capabilities of these devices is therefore independent of natural light levels, however the radiation source is susceptible to detection and in some instances to exploitation by jamming or deception countermeasures.

b. Passive Devices. These devices do not depend upon artificial illumination, but rely upon natural radiation reflected from or generated by the target. Artificial visible or infrared illumination may be employed to increase the effectiveness of those devices depending upon reflected radiation for their operation. Although passive, these devices are subject to jamming or deception through appropriate countermeasure techniques.

2-27. Radars

Radars are employed in offensive, defensive, retrograde, and other operations, both mobile and static. In mobile warfare, radars are employed aggressively to approach a continuous, all weather, all light condition capability of detecting enemy activities, controlling friendly movement, and detecting hostile mortar or artillery firing positions. In static situations, positioning is changed periodically and alternate positions prepared to neutralize enemy detection and countermeasures. Use of available radar is coordinated for a complementary surveillance effort. Ground surveillance, countermortar and counterbattery radars are active devices and are subject to electronic countermeasures and detections.

2-28. Employment

The proper employment of the various night observation aids will greatly enhance the following aspects of night vision/operations.

a. Intelligence. The success of any operation, no matter how large or small, may well depend on the intelligence available to the commander. From the smallest tactical element to the field army level, the collection of intelligence is a continuous process. Through the proper employment and use of his all weather, day/night surveillance, reconnaissance and night vision aids, the commander greatly enhances his information collection and target acquisition capability, (see FM 30-5, 30-20, 31-36 (Test)).

b. Mobility. During the periods of darkness or reduced visibility, commanders at all echelons are restricted in their ability to maneuver, replace, resupply and reorganize their forces. By proper utilization of illumination techniques and various night vision aids, a commander may securely and rapidly redeploy his forces (mounted or dismounted), avoid the enemy or initiate swift offensive actions.

c. Firepower. The fundamentals of fire support are unchanged for periods of reduced visibility. However, operational techniques must be modified to consider the inherent capabilities and limitations of available fire support elements (artillery, mortars, naval gunfire, tactical air, attack helicopters) during periods of darkness. The problems associated with mobility, target acquisition, and fire support coordination are increased during these periods. Proper employment of appropriate night operational techniques, night vision aids, and target acquisition equipment will reduce losses in effectiveness due to poor visibility.

d. Command, Control, and Communications. Night vision devices improve means of exercising control at night. These devices can be used for observing signals, observing unit positions, and identifying control measures.

CHAPTER 3

RECONNAISSANCE AND SURVEILLANCE COUNTERMEASURES

3-1. General

Counterreconnaissance and Countersurveillance encompasses all efforts taken to prevent the enemy from observing or otherwise detecting friendly activity, movement of friendly forces and/or their locations. This denied observation or detection enhances the security of the friendly force affording it the opportunity to gain and maintain freedom of action. These counteractions may include but are not limited to the use of electronic countermeasures, screening forces, and all available deceptive measures.

a. Electronic Countermeasures (ECM). Reliable operation of the enemy's communication—electronic systems is essential to effective acquisition, processing, integration, and dissemination of information and intelligence in support of his reconnaissance and surveillance operations. In general, the degree of his reliance on communications electronics (COMMEL) means is directly proportional to the magnitude, sophistication and productivity (e.g., threat) of his reconnaissance and surveillance systems. In many cases, these systems, including their associated communication links, can be degraded through selective and well-planned use of electronic countermeasures (ECM), both jamming and deception. For example, jamming can prevent or interfere with the reception of the desired signal by hostile radios, radars or other receiving equipment. Through electronic deception, false information can be presented to hostile sensory devices, radio operators and, ultimately, commanders to cause the enemy to react in a manner advantageous to friendly forces. Additionally, the enemy may be deprived of the effective use of night observation devices through the employment of optical countermeasures. To optimize ECM applications against the enemy's integrated reconnaissance and surveillance systems, information must be obtained from SIGINT, electronic warfare support measures (ESM), technical intelligence, and other collection sources. The resulting intelligence

aids the commander in determining the feasibility of implementing electronic countermeasures as opposed to other counteractions (e.g., fire and maneuver); (see FM 32-10 and FM 32-20 for further details regarding ECM).

b. Screening Forces. Screening forces are echeloned in depth to provide mutual support and to limit penetrations by enemy reconnaissance and surveillance elements. The counterreconnaissance screen prevents enemy reconnaissance forces from entering certain areas or places. It may be moving or stationary depending upon the activities of the force being screened. All units have countersurveillance capabilities and responsibilities. These responsibilities may be limited to short patrols or defensive countersurveillance measures during the conduct of normal mission activities, or they may extend to offensive operations involving specific surveillance or countersurveillance tasks. Certain units are specifically organized for such operations.

c. Counterintelligence. Effective counterintelligence increases security and aids in the achievement of surprise by denying information to the enemy through offensive and defensive measures. Offensive counterintelligence measures are designed to block the enemy's attempts to gain information. They include counterreconnaissance, electronic countermeasures against hostile SIGINT and ESM activities, challenge and password systems, and air and ground reconnaissance to detect and expose the enemy's intelligence effort. Defensive measures conceal information from the enemy. They include censorship, secrecy discipline, security of classified documents and material, signal security, movement control, use of concealment, camouflage, and control of civil populations. Efforts in these areas will be assisted by higher headquarters military intelligence and Army Security Agency personnel.

d. Deception. And deceptive measure taken by a command to confuse the enemy and deny him the opportunity to observe the true intent or ac-

tivity of the friendly force may be classified as a countermeasure.

(1) Deceptive aerial reconnaissance flights can be made for the sole purpose of focusing the enemy's attention on an area for which no operation is planned and away from an actual objective area. However, most reconnaissance flights are conducted to collect information on specific areas or activities, and counterintelligence techniques are integrated into those flights by the aviation units performing the flights.

(2) Smoke can be employed as a deception measure in the attack. Smoke is normally placed on the enemy, since this confuses him a great deal more than if the smoke is placed to cover friendly troops. It makes his fire must less accurate. If the general location of the enemy cannot be determined, the smoke screen should be placed in front of suspected enemy locations. Smoke may also be utilized in a defensive posture to prevent hostile observation of friendly activities.

(3) Electronic deception is a significant means of countering enemy reconnaissance and surveillance capabilities. Through means (such as use of light on heat sources to present false targets to enemy passive IR devices) false infor-

mation can be presented to enemy sensors which can cause the enemy to miscalculate friendly capabilities and courses of action. Similarly, deceptive techniques (such as insertion of fraudulent traffic) can be aimed at enemy communications circuits carrying information and intelligence; (see FM 31-40 and FM 32-20 for further explanation). Coordination with the electronic warfare element (EWE) is essential as concerns any plans for communications deception.

3-2. Plans

Plans take cognizance of the special vulnerability of both friendly and enemy operations through increased reliance on night vision aids for their success, and the susceptibility of these aids to detection and countermeasures. Plans include provisions for special security measures to reduce the probability or alleviate the impact of detection and special deception measures to capitalize on probable detection. Plans are drawn to avoid catastrophic failure in event friendly night vision aids and communications are put out of action by physical or electronic countermeasures. Plans are made for physical or electronic countermeasures (to include deception) against enemy night vision aids.

CHAPTER 4

STANO MEANS

4-1. General

a. Within the field army there are many types of STANO and STANO-related equipment available to meet commanders' requirements for information of the enemy or to facilitate night operations. Each type of equipment has characteristic capabilities and limitations which determine the conditions under which it functions most effectively. No single type of STANO equipment can satisfy all of a commander's information needs. Neither can a single type function effectively in all operational and physical environments. It is therefore necessary to employ a balanced combination of available means to insure adequate coverage of the battlefield.

b. Commanders and staff elements responsible for planning and supervision of the collection effort must be familiar with the capabilities and limitations of the STANO means available to the command. Such knowledge is essential for sound planning and efficient employment of all collection assets.

c. In regard to vulnerabilities, staff planners should note that many STANO devices rely on electromagnetic energy for the sensing function, and transmission of sensed data via communication link to the monitoring station. As electromagnetic energy is radiated the STANO system becomes exposed to the hazard of hostile signal detection, interception, analysis, direction finding, and the potential consequences of electronic countermeasures (jamming and deception). The detailed discussion of jamming and deception contained in FM 31-40 and FM 32-20 is applicable to STANO systems.

4-2. Vision/Optics

a. General Characteristics and Capabilities. Vision/Optics refers to the use of standard optical devices that amplify the target or scene. Examples include the standard daylight binoculars (7x50 or 6x30), Battery Commander (B.C.) Scopes and telescopes. Their function is to magnify and instantly present a visual representation of the target area. Their use extends acquisition

range far beyond the normal capability of the human eye. Additionally, a stabilization capability may also be coupled to the device permitting the presentation of a stationary image when the optical instrument is vibrating.

b. Limitations. These devices are limited primarily to daytime use. During hours of reduced visibility their use is restricted to areas having clear atmospheric conditions and light levels comparable to full moonlight or greater.

c. Applications. Optical instruments perform a wide number of functions, including battlefield surveillance, adjustment of fires, surveying and laying mortars and artillery pieces.

4-3. Aerial Photography

a. General Characteristics and Capabilities. Aerial photography provides a permanent record of a target scene. A standard night photographic capability is provided using a high-intensity strobe-light flasher system pod-mounted on surveillance aircraft. A technique being considered for future Army use is the laser line scan camera employing a laser beam in a terrain scanning sequence. In addition to emitting a low level of visible light it produces a high resolution photograph. Finally, the use of thermally activated photographic film provides a capability for producing excellent night photographs.

b. Limitations. Photographic techniques have inherent limitations, the primary problem being the requirement for a platform or vehicle to transport the camera system. The platform is susceptible to enemy observation and countermeasures. Those most responsive to the Army in the field have a limited range in mid and high-intensity warfare, and its angle of observation may negate clear target definition. Atmospheric and weather conditions also tend to degrade aerial photography. Timeliness of target information is limited due to time required to analyse photographs. However, fixed targets or targets with limited mobility may be located by photographic means without impairing their suitability for attack.

c. Applications. Typical applications include the Mohawk photographic system, which is designed to overfly terrain of interest. The use of the flasher system enhances the Mohawk capability for night photography. Another application is the aerial thermal imagery system which records the thermal image of the terrain. Less sophisticated applications include the handheld camera used to photograph targets of interest during the hours of daylight.

4-4. Image Intensification

a. General Characteristics and Capabilities. Image intensifiers are used to present target images at night, using only the light available from starlight, moonlight, skyglow, and/or from a supplemental light source. Exposed targets may be detected and identified within the effective range of the device. Range is dependent upon the size of the image intensification tube and optics used as well as the amount of available light. Ranges are greatly increased when the device is used with supplemental IR or "pink" light. In addition to providing increased ranges, pulse-gated illumination (a pulsing IR source and gated receiver) will allow some penetration of fog, haze, and rain and will provide accurate ranging of targets. Except when employed with pulse-gated equipment or supplemental illuminators, image intensification is a passive technique.

b. Limitations. Bright light will cause image intensifiers now in use to shut off automatically. Therefore, they cannot be employed during daylight hours (without using filters) or when otherwise exposed to a high intensity light source. On the other hand, the device will not function when the light level drops below starlight, unless supplemental illumination is provided. Rain seriously degrades the efficiency of the image intensifiers unless a pulse-gated illumination system is used. Pulse-gated equipment is heavy and can be detected by an enemy using image intensifiers or IR detection devices.

c. Applications. Image intensifiers are employed in rifle sights, tank fire control equipment, aerial and ground surveillance devices and night visual aid equipment for the individual soldier.

4-5. Disturbance Sensing

a. General Characteristics and Capabilities. Disturbance sensing employs the principle of recognizing physical contact with the target. In this instance, contact of any part of an individual's body with the device will activate a warning signal. Excellent examples are the many

booby-trap detonators currently available; however, these devices are not used in a sensor role. One of the most common disturbance sensors presently in use is the noiseless button bomblet, which contains a very small radio transmitter and a triggering network. The device is further disguised as a small twig, branch, chip of wood or, in some cases, as animal excrement. As an intruder traverses an area that has been seeded with these sensors, he may cause one to activate. The radio frequency warning is then relayed to a monitoring station.

b. Limitations. The problem with this device is the requirement that the intruder directly contact the sensor. In order to increase probability of detection, an area must be densely seeded. Additionally, the disturbance sensor is susceptible to a high level of false alarms caused by animals, heavy rainfall or similar disturbances.

c. Applications. Disturbance sensors are useful in gathering information concerning enemy movements and areas of activity. They may also be used for locating targets for supporting indirect or aerial fires.

4-6. Thermal Imaging

a. General Characteristics and Capabilities. Thermal imaging takes advantage of the thermal contrast that exists between a target and its background. The thermal image, immediately displayed on a phosphorescent tube, is similar in appearance to a black and white photograph. "Hot" items, such as engine exhaust gases or hot metal, appear brightly on the display. The high thermal contrast between targets and their background makes it possible to detect objects that might be partially obscured or concealed by light foliage or camouflage netting. Thermal imaging devices may be used in daylight or darkness, and are difficult to detect by the enemy.

b. Limitations. The range of thermal imaging devices is reduced during extremely inclement weather. However, the extent of this reduction has not yet been determined.

c. Applications. Thermal imaging sensors are used for surveillance, target acquisition, and fire control in ground, vehicular, and aircraft mounted systems.

4-7. Radar

a. General Characteristics and Capabilities. Radar is one of the few sensors that approaches all weather, day or night capability. The most widely used radar for tactical employment in-

corporates the moving target indicator (MTI) technique for locating targets. This technique suppresses stationary clutter, and intensifies moving targets. Aerial radar used in Army surveillance aircraft has an MTI and a fixed-target (FT) capability. Major terrain features and structures can be detected and identified from the FT display. Special purpose radars are designed to perform functions such as foliage penetration or metal detection. Of all the surveillance techniques now in use, radar provides the greatest range capability for detection of moving targets.

b. Limitations. The moving target indicator (MTI) technique does not detect fixed targets, such as terrain and structures. MTI radar has an excellent long range target detection capability, however, it is restricted to line-of-sight detection, and its ability to recognize and/or identify targets is relatively limited. Although the range of radar may be extended by mounting it on an aerial platform, the availability of the system is then limited by weather considerations. Since radars are active systems, they are subject to electronic countermeasures which may inhibit or prevent their employment.

c. Application. A wide variety of radar equipment is emerging for use at all levels, from company through field army. Examples include foliage penetration radar, tunnel detectors, terrain avoidance radar (aerial), helicopter rotor blade radar (HELMS) (for accurate altitude measuring), and mortar locating radars.

d. Vulnerabilities. Each time a radar is activated, its signals are subject to enemy intercept. The intercepted signals provide enemy SIGINT and ESM analysts the location and signal parameters of the radar permitting specification of radar type, its association with specific military units, and the employment of means to jam or deceive it.

4-8. Acoustic Sensing

a. General Characteristics and Capabilities. Acoustic sensing is based upon the familiar microphone which detects audio frequencies. This technique may be enhanced by using spectrum analyzers to analyze the sound wave and provide improved definition of the target source. Acoustic devices are usually omnidirectional in nature but can be designed to provide a directional capability.

b. Limitations. Acoustic devices are extremely sensitive and, consequently in a noisy combat

environment, tend to transmit extraneous signals. Efforts to decrease the transmission of incidental noise has resulted in devices which are too costly or range limited. Acoustic ranging or direction finding devices require a relatively quiet environment for effective operation.

c. Typical Applications. Acoustic devices are typically employed in two roles: (1) unattended ground sensors, and (2) ranging and azimuth counterbattery systems. Examples include the ACOUBUOY or ACOUSID unattended ground sensors, and the counterbattery sound ranging systems employed by artillery. In both applications, audio signals provide target location or direction.

4-9. Seismic Sensing

a. General Characteristics and Capabilities. Seismic sensing detects the vibrations of the earth caused by the passage of a target. As a truck or man traverses terrain, vibrations are caused within the earth. These vibrations travel extended distances before dissipating. Because of this characteristic, the seismic technique has evolved as an effective sensing method. The military usefulness of seismic sensing has been improved by the development of internal logic circuits which provide a degree of discrimination against the detection of non-military targets.

b. Limitations. The detection range of the seismic sensor is limited by the ability of the soil to transmit vibrations. This limited range requires that either a large number of sensors be emplaced or that detailed plans be made for effective employment. Seismic sensors can be activated by a variety of vibration sources, thereby generating false alarms. The frequency of such false alarms may be reduced to some extent by appropriate logic circuits and sensitivity adjustments.

c. Applications. The best example of a seismic sensor is the unattended ground sensor (e.g., patrol seismic intrusion detector, (PSID) and the ground seismic intrusion detector (GSID)), which detects vibrations and then transmits a signal to a monitoring station. In some sensors, the seismic recognition of a target alone is not sufficient to initiate a signal. A second target signature, such as the presence of metal or heat, may be required before the warning signal is transmitted.

4-10. Electromagnetic Sensing

a. General Characteristics and Capabilities. Electromagnetic sensing is best described as a

method of detecting a moving intruder. A radio frequency (RF) field or pattern is activated around an antenna, and an intruder moving within that field causes fluctuations in that pattern, resulting in the transmission of a warning signal. Electromagnetic sensing devices are normally quite small and easily concealed, since only the antenna must be exposed.

b. Limitations. The electromagnetic sensor is susceptible to movement within its RF field. This becomes critical when it is positioned near foliage, tall grass or other objects which will move in the wind. Its most ideal location is in clear, open terrain. Adjustments may be made to decrease the sensitivity of the device, however, decreased sensitivity decreases the range of the device. Most devices require that the intruder traverse the RF field at a velocity associated with that of a walking man which implies it is possible for a very slow, crawling man to pass undetected. The continuous RF field required for the operation of the device consumes power; therefore the sensor requires a large power supply.

c. Typical Applications. An example of an electromagnetic sensing device is the Electromagnetic Intrusion Detector (EMID), which consists of an antenna camouflaged to resemble a weed, vine or stalk of grass, and a small logic/transmitter package. It may be successfully used in open terrain, along trails, and on beaches.

d. Vulnerabilities. Any sensors which must relay information to remoted read-out stations by means of radio signals are, to some degree, vulnerable to interception of its signals, and to jamming or deception against its receivers.

4-11. Magnetic Sensing

a. General Characteristics and Capabilities. Magnetic sensing detects the movement of iron or steel objects through a magnetic field. These devices are quite selective, since only ferrous material will cause an activation, thereby eliminating alarms from animals or other non-military targets.

b. Limitations. Magnetic sensing will not recognize intruders who do not carry metal on their person. The range of the device is limited since only a small magnetic field disturbance can be generated by the movement of ferromagnetic materials. In order to increase the area in which detection is possible, linear sensing devices have been developed, however, their installation is both tedious and impractical in rapid moving situations.

c. Applications. Magnetic sensing has proven quite effective in tracing the movement of enemy vehicles. Its use against ferrous targets is evident. It also is used to confirm the presence of enemy activity when coupled with another type of sensor.

4-12. Pressure Sensing

a. General Characteristics and Capabilities. A pressure sensor is designed to recognize the pressure caused by the passage of a target. It may be point located, as is a pressure sensitive mine, or it may be deployed in a linear arrangement. The latter example is most commonly used. In a typical linear pressure sensing example, a liquid filled hose is buried along a potential intruder route. As the intruder's weight compresses the soil around the hose, the device will transmit a warning.

b. Limitations. Pressure sensing devices are extremely sensitive to the type terrain and the weather. In cold climates, frozen ground may make the device useless. The deployment of the linear sensors is slow, and does not lend itself to effective employment in rapidly moving situations.

c. Applications. Pressure sensing systems are typically employed in fixed locations where the installation time is not critical and a permanent device is required. Base camps and border installations are good examples.

4-13. Condensation Nuclei Sensing

a. General Characteristics and Capabilities. Condensation nuclei sensing is a method of detecting condensation nuclei, e.g., submicroscopic airborne combustion particles such as campfire smoke and exhaust fumes from motor vehicles, which indicate present or recent (period up to about 24 hours) human activities in a given area. Conditions favoring optimum detection include steady, uni-directional light winds (3 to 5 knots), lapse condition (rising air), and immediately after a rain.

b. Limitations. Strong winds (above 8 knots) and variable direction winds cause combustion particles to diffuse rapidly, thereby severely limiting or precluding their detection. An inversion condition (descending air) impedes the rise of combustion product particles, thereby severely limiting their detection.

c. Typical Application. An example of a condensation nuclei sensing device is an aircraft-mounted concealed personnel detector. Compo-

nents of this type detector include two identical condensation nuclei detectors and a strip-chart recorder which provides an automatic, continuous, and instantaneous display of responses from both condensation nuclei detectors. This type detector, accompanied by an observer, is mounted in a helicopter. The helicopter is flown near tree top level over a target or search area, e.g., dense foliage, likely ambush sites, or trail areas, and air is drawn through the condensation nuclei. The detection of condensation nuclei in the sampled air is an indication of area occupation or activities by humans.

4-14. Illumination

a. General Characteristics and Capabilities. The oldest night vision aid is battlefield illumination by fires and flares. The most familiar modern device for battlefield illumination is the searchlight. Searchlights may be used to produce either visible light or infrared light for direct or indirect illumination. Indirect illumination over a large area is achieved when the searchlight

beam is directed towards a low cloud bank which reflects light upon the battlefield. A level of illumination equivalent to moonlight may be achieved through indirect illumination. More recent techniques in illumination incorporate lasers and laser illuminators.

b. Limitations. Battlefield illumination employs active systems, and the enemy, properly equipped, can detect our use of them. Indirect searchlight illumination produces a low light level and cannot be used for long range observation without supplementary night vision aids. Searchlights are also vulnerable to heat-seeking weapons.

c. Application. Artificial illumination may be used in any situation to simulate daylight conditions. It is used for maneuver, application of fire power, surveillance, observation, or target acquisition. It may be used as a deception measure. Invisible light is used only when light intensification devices are employed. Searchlights may be ground vehicular, combat vehicular, or helicopter mounted. Tank mounted searchlights are used to assist in target acquisition and delivery of direct fires during darkness.



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CHAPTER 5

STANO ASSETS WITHIN THE FIELD ARMY

Section I. INTRODUCTION

5-1. General

a. In organizing and distributing his forces to fulfill his mission on the battlefield, the commander must consider the intelligence capabilities and requirements of his forces in addition to their firepower and maneuver capability. The task organization of the command should then result in a force which reacts rapidly, delivers effective fires, and equally important, knows when and where to move with the proper amount of force. Intelligence permits direction and provides urgency to the combat efforts of the command; the basic input of intelligence is STANO.

b. The surveillance and target acquisition needs of the subordinate elements of his command

must be appreciated by the commander so that sufficient STANO assets may be provided to support the missions of these elements. A unit may obtain needed information through its own organic STANO assets, through attached or supporting elements, and from adjacent or higher headquarters.

5-2. Scope

The following sections briefly describe the information requirements at the various command levels within the field army, the STANO assets organic to those levels, assets available through attachment or direct support, and the communications networks used to disseminate the information obtained by STANO means.

Section II. FIELD ARMY

5-3. STANO Information Needs

a. The field army G2 is concerned with strategic intelligence as well as combat intelligence. The scope and projection of field army operations and the simultaneous planning for a number of operations interject into Army intelligence planning a number of factors that warrant consideration.

b. The scope and the long range of field army operations affect intelligence planning in preparation for combat as follows:

(1) Preliminary and initial intelligence planning is based largely on assumptions. As planning progresses, particularly as operational details are made firm, the assumptions can either be substantiated as fact or, if erroneous, discarded.

(2) Intelligence planning is flexible, although with respect to gathering information of weather and terrain in the probable area of operations, it is not so flexible as in the cases of personnel and operational or logistical planning. The farther an operation is projected into the future, the more

likely are changes in the situation that might radically alter the plans. Provisions are therefore made for all foreseeable contingencies.

(3) Concurrent planning by subordinate echelons is not ordinarily feasible in the early stages of planning for an operation scheduled far into the future. This is due to their involvement in the operation in progress and the urgency of planning for the next operation. Sufficient data usually are not available to give the corps.

c. At field army level, surveillance requirements are characterized by the depth of penetration required and a lesser need for continuous surveillance coverage. Enemy objects and activities subject to surveillance include movement and location of major reserves, long-range missile sites, command posts and combat service support complexes, and electromagnetic emissions. Other surveillance requirements include information of the terrain, weather, nuclear detonations, and contaminated areas. Normally, periodic surveillance will suffice. The length of time between missions will vary with the situation. In fluid situations,

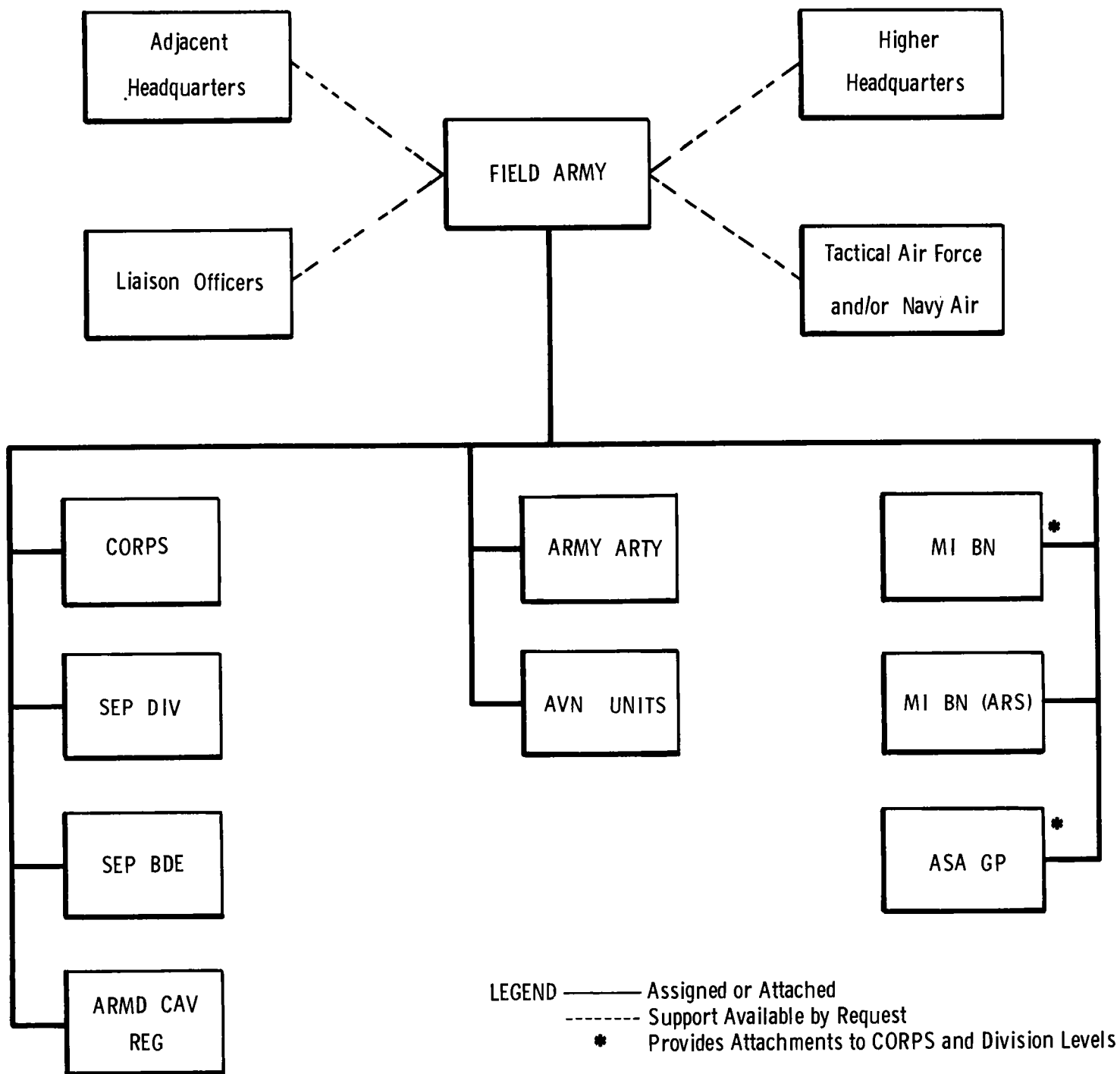


Figure 5-1. Major STANO assets, field army organization relationship.

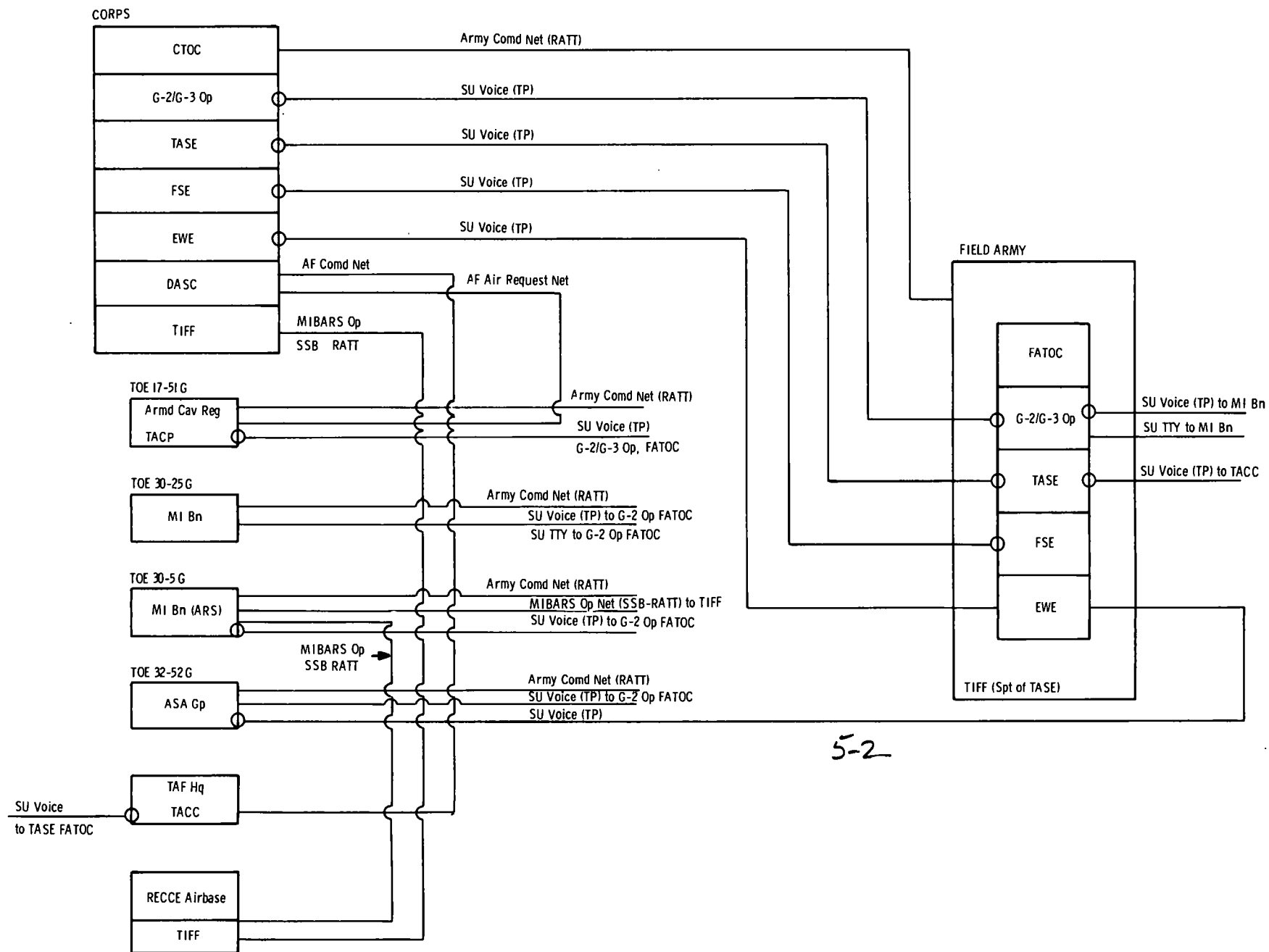


Figure 5-2. Typical field army STANO communications network.

continuous surveillance of given activities or objects for short periods may be required.

5-4. Field Army STANO Assets

To assist in providing the intelligence information required by the field army, certain units are assigned for employment at the army level.

a. The armored cavalry regiment employs its ground and aerial reconnaissance units to provide reconnaissance and surveillance capabilities at the field army level. The regiment is equipped with night vision devices, radar, and unattended ground sensors to assist it in performing its STANO missions. See FM 17-95 for the organization, missions, and employment of the armored cavalry regiment.

b. The military intelligence battalion of the field army provides assistance to the G2 in the areas of prisoner-of-war interrogation, imagery interpretation, order of battle, counterintelligence, area intelligence, technical intelligence, strategic intelligence, translation, interpretation, intelligence analysis, intelligence editing, and censorship. The functions of the field army military intelligence battalion are described in FM 30-9.

c. The military intelligence battalion, air reconnaissance support, (MIBARS) performs the following functions: (see FM 30-20).

(1) Processes, interprets, annotates, reproduces, and delivers imagery obtained from tactical air force elements operating in support of the field army.

(2) Performs coordinated imagery interpretation and reproduction from widely separated

reconnaissance airfields and from the vicinity of the supported Field Army Headquarters.

(3) Disseminates intelligence information obtained through imagery interpretation or visual aerial reconnaissance sightings.

(4) Provides air reconnaissance liaison officers to Air Force reconnaissance elements supporting the field army.

(5) Briefs and debriefs tactical air reconnaissance aircraft crews.

d. The Army Security Agency group at field army provides electronic warfare support measures. The support rendered by the group is not limited to its organic resources, but includes that available through direct access to capabilities of higher echelons and to other service SIGINT/ESM resources (see FM 30-5 and 32-10).

e. The U.S. Army Special Forces Group, which normally operates in support of the unified command, has resources in the form of friendly guerrilla units or unilaterally employed Special Forces units which can be of value to the G2. These elements, when operating within the field army's area of interest, may either employ STANO devices unilaterally or may employ these devices in concert with other intelligence sources to assist in monitoring the movement of enemy forces and the location of enemy fire support means.

5-5. Communications

The field army receives and disseminates STANO information by telephone and radioteletype. Figure 5-2 illustrates a typical field army communications network.

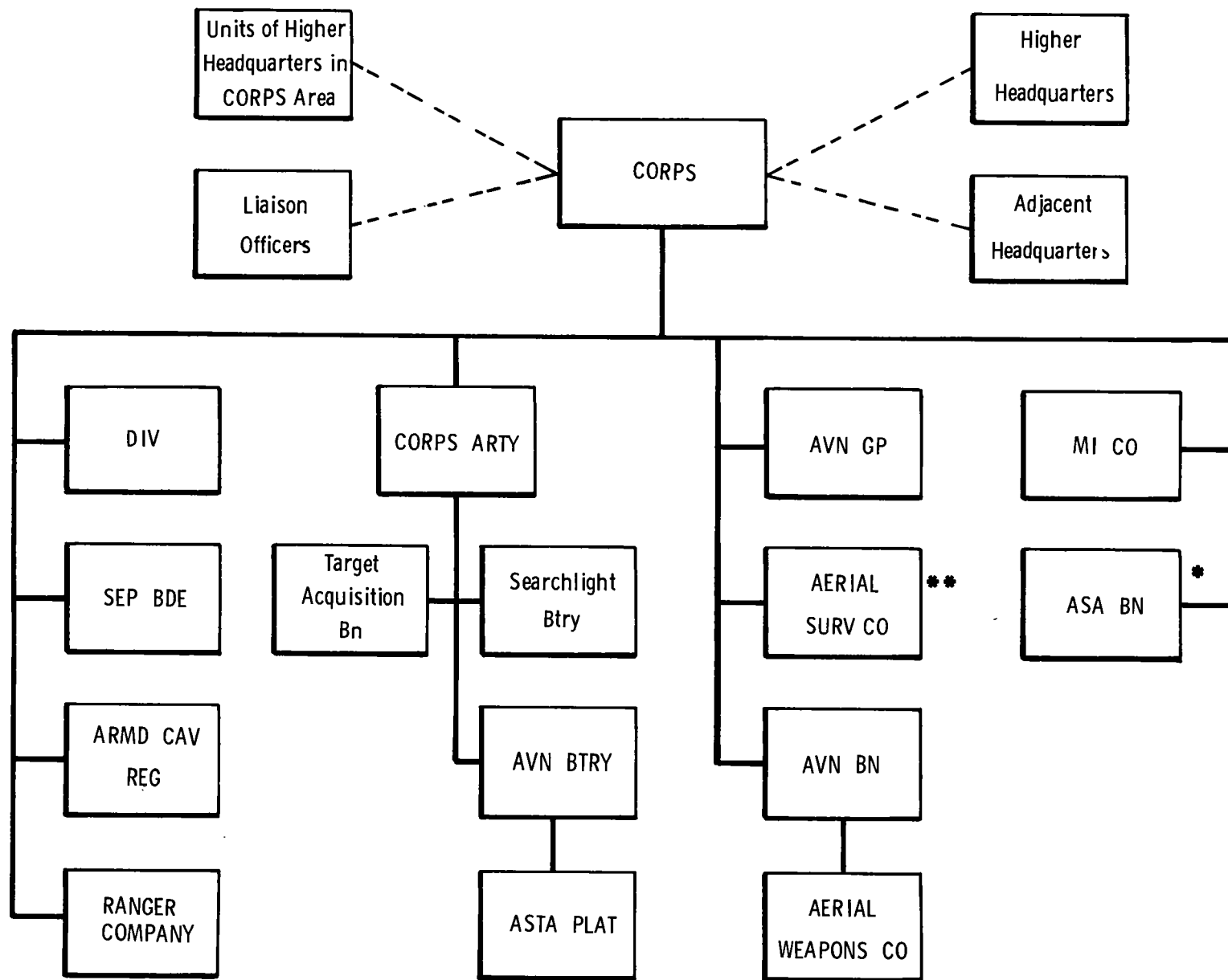
Section III CORPS

5-6. STANO Information Needs

a. Intelligence planning at corps is based on army plans and is primarily a matter of determining how, by whom, and when the intelligence functions of the corps will be performed, and sets forth the details in a logical, understandable fashion. Each of the phases is generally the same as it is for the field army, but the time available to corps will be less than that available to the field army. During the execution phase of an operation, the corps G2 section is primarily concerned with the fulfillment of those functions which pertain directly to the operation. It will also be engaged in planning for future operations. Generally corps planning does not require the

establishment of a separate planning staff or a separate planning group within the G2 section.

b. At corps level, surveillance requirements are generated by both immediate and future operations. They are characterized by deep penetration of the enemy territory and a general reliance upon aerial surveillance means. Continuous surveillance is required to detect or obtain information of movements of enemy reserves into or within the corps area of interest, location of enemy reserves and fire support weapons in the corps area of interest, missile attack, CBR and air attack, nuclear detonations, electromagnetic emissions, and weather. Periodic area surveillance is required for supplemental information on the



LEGEND — Assigned or Attached
 - - - Support Available by Request
 * Provides Attachments to Division Level
 ** May be Assigned to Field Army

Figure 5-3. Major STANO assets, corps organization relationship.

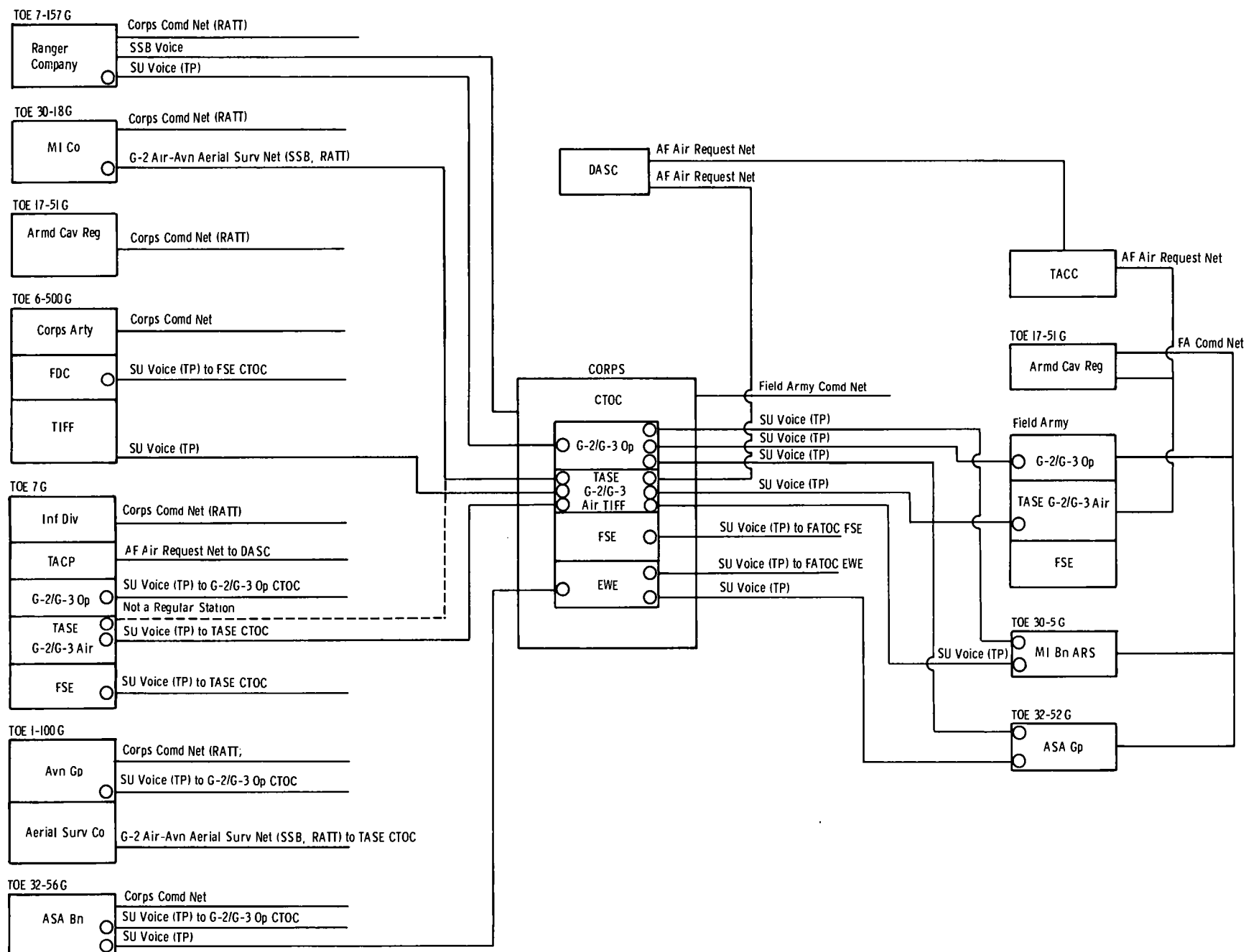


Figure 5-4. Typical corps STANO communications network.

enemy and terrain required for planning the next operation. During fluid situations, continuous area surveillance is required to assist in determining the probable enemy course of action and location of his main effort. In static situations, periodic area coverage may suffice.

5-7. Organic STANO Assets

The corps has a number of assigned or organic units whose missions are largely or completely determined by the intelligence information needs of the corps commander.

a. The armored cavalry regiment provides ground and aerial reconnaissance and surveillance for the corps through the employment of its ground and aerial reconnaissance elements. These elements are equipped with night vision devices, illumination means, surveillance radars, and unattended ground sensors (see FM 17-95).

b. The aerial surveillance and target acquisition platoon of the corps artillery aviation battery performs aerial reconnaissance, surveillance and target acquisition missions in support of corps artillery units. The platoon is equipped with aerial cameras, radar, and infrared sensors.

c. The corps artillery searchlight battery provides illumination within the corps area. The battery is equipped with long range searchlights capable of visible or infrared illumination (see FM 6-115).

d. The corps artillery target acquisition battalion provides counterbattery target information by means of flash ranging, sound ranging, and counterbattery radar (see FM 6-120).

e. The aerial surveillance company of the corps aviation group provides combat surveillance and target acquisition with aerial observers, aerial cameras, radar, visual reconnaissance and infrared sensors (see FM 30-20).

f. The aerial weapons company of the aviation battalions organic to the corps aviation group can provide aerial reconnaissance and surveillance through the employment of its organic armed helicopters.

g. The Ranger Company performs long range ground reconnaissance and surveillance missions for the corps. The Airborne Infantry Ranger Company is equipped with night vision devices and may be equipped with unattended ground sensors to assist in the performance of its missions (see FM 31-18).

5-8. STANO Assets Available Through Attachment or Direct Support

In addition to its organic or assigned STANO assets, the corps has a military intelligence company, which is attached from the military intelligence battalion assigned to the field army. This company provides the corps G2 with assistance in the specialized fields of order of battle, interrogation of prisoners of war, document translation, counterintelligence, imagery interpretation, and technical intelligence (see FM 30-5). An Army Security Agency battalion provides support to the corps in the areas of signal intelligence, and electronic warfare support measures (see FM 30-5 and 32-10). The battalion has direct access to capabilities of higher and adjacent echelon SIGINT/ESM resources.

5-9. Communications

The corps receives and disseminates STANO information by means of voice radio, radioteletype, and telephone. A typical communications network which supports the corps' requirements for communicating STANO information is shown in figure 5-4.

Section IV. DIVISION

5-10. STANO Information Needs

a. The intelligence planning at division in preparation for combat is based on plans and directives of the next higher headquarters. The same planning phases are applicable, although the preliminary phase will be considerably shortened. In addition to absorbing and disseminating the intelligence made available as a result of intelligence activities at higher headquarters, the division G2 develops intelligence requirements, submits requests for additional support from higher

headquarters and Air Force assets, levies requests for information, and exploits any other sources available to him. In view of the reduced time available to prepare for combat, the division G2 must keep himself currently informed as to planning being undertaken at the next higher echelon.

b. At division level, surveillance requirements are characterized by the immediacy of operations. Continuous surveillance is required to obtain information of movements into or within the area of influence, enemy dispositions, employment of

supporting weapons, electromagnetic emissions, nuclear detonations, CBR or air threats, weather, and topographical features. Periodic area surveillance is required for general information of the enemy and terrain to supplement current general intelligence. During fluid situations, continuous area surveillance is required. During static situations, periodic coverage of the area may suffice.

5-11. Organic STANO Assets

The division has organic elements which are employed to meet the division's STANO information needs.

a. The armored cavalry squadron provides ground and air reconnaissance and surveillance capability through the employment of its ground and aerial reconnaissance units. The squadron is equipped with night observation and illumination devices, surveillance radar, and unattended ground sensors. For a detailed description of the organization, missions, and employment of the armored cavalry squadron, see FM 17-36.

b. The target acquisition platoon of the headquarters and headquarters battery of division artillery provides a surveillance and target acquisition capability through the use of its long range surveillance radar. For a more detailed discussion of the target acquisition platoon of the division artillery, see FM 6-121.

c. The field artillery direct support battalions of division artillery provide surveillance and target acquisition capabilities with their forward observers and countermortar radars. See FM 6-140 for a thorough description of the organization, missions, and employment of field artillery cannon battalions.

d. The aviation battalion can provide aerial reconnaissance support to the division through the employment of its organic aircraft. See FM 1-15 for a discussion of the capabilities of the aviation battalion.

e. The proposed unattended ground sensor platoon of the division headquarters and headquarters company provides a ground surveillance capability to the division with its unattended ground sensor teams.

f. In addition to the units listed above, whose missions are specifically STANO oriented, the maneuver elements of the division must also be considered major STANO assets. The organization and distribution of forces on the battlefield provides the concentrations of basic STANO information producers—combat troops—and the basic network for the receipt and dissemination of information—the chain of command.

5-12. STANO Assets Available Through Attachment or Direct Support

Some assets required by the division are not organic, but are provided by higher headquarters either routinely or in accordance with special mission requirements. Units which are frequently attached or placed in direct support of the division are—

a. The military intelligence company, which is attached from the field army military intelligence battalion, provides assistance to the G2 in the specialized fields of order of battle, imagery interpretation, counterintelligence, interrogation of prisoners of war, and document translation. The functions of the divisional military intelligence detachment are presented in FM 30-9.

b. A target acquisition battery from the corps artillery target acquisition battalion may be attached or in direct support of the division. The target acquisition battery provides counterbattery information from its flash ranging, sound ranging, and counterbattery radar platoons. The target acquisition battery is discussed in detail in FM 6-120.

c. A searchlight platoon from the corps artillery searchlight battery may be provided to the division to add a long range searchlight illumination and infrared capability. The missions and employment of the searchlight platoon are covered in FM 6-115.

d. A patrol platoon from the corps Ranger Company may be attached in order to provide long range ground reconnaissance and surveillance for the division. See FM 31-18 for a discussion of the Ranger Company.

e. An Army Security Agency company from the corps' Army Security Agency battalion is normally attached in direct support to the division for SIGINT, ECM, and ESM support. The support rendered by this company is not limited to its organic resources but includes that available through direct access to capabilities of higher and adjacent echelon SIGINT/ECM/ESM resources.

f. In addition to the above units, which are attached or placed in direct support of the division, additional resources from higher headquarters are made available to the division on a single mission basis. An example of this support is the routine processing and execution by higher headquarters of the division's requests for aerial reconnaissance or surveillance support.

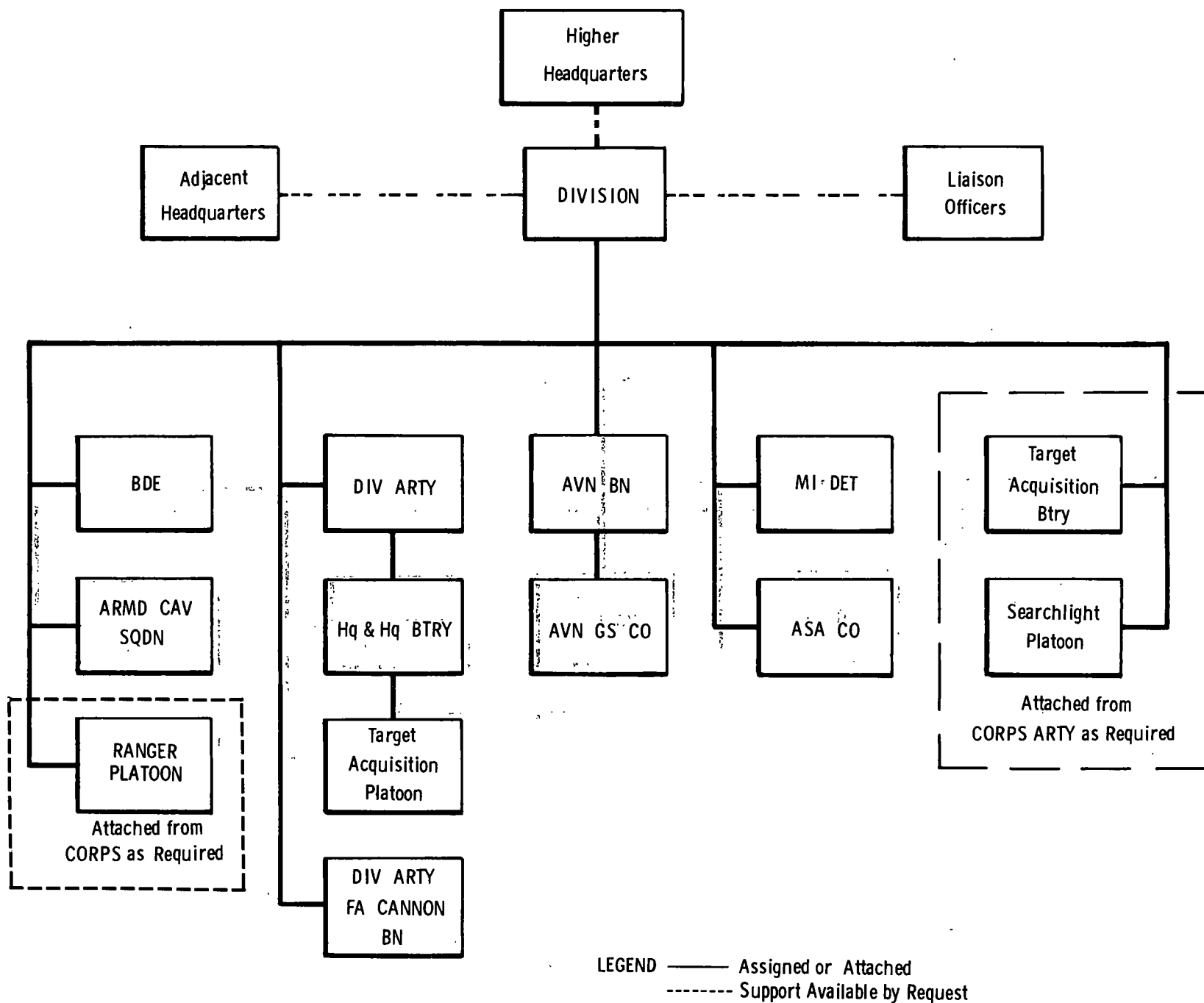


Figure 5-5. Major STANO assets, division organization relationship.

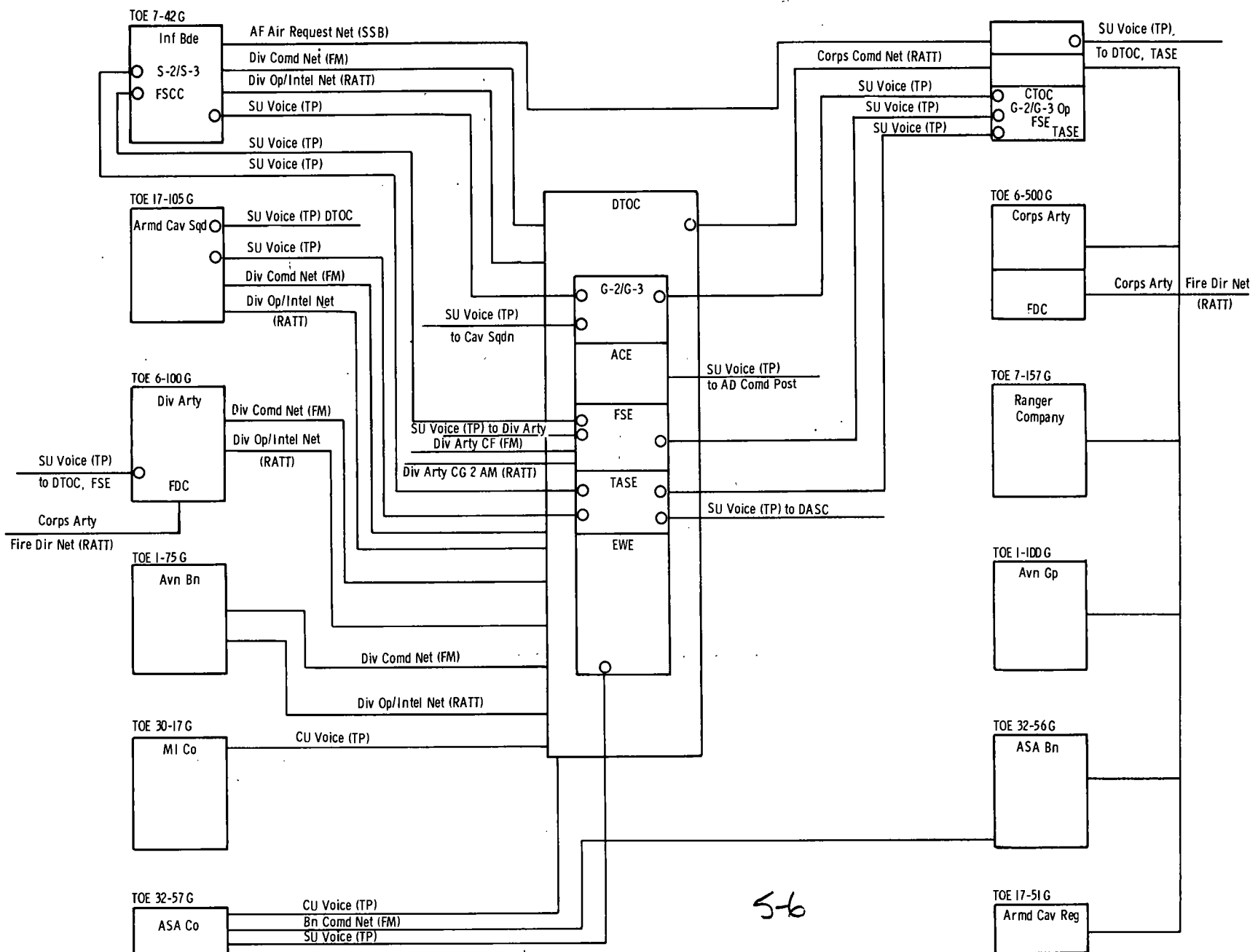


Figure 5-6. Typical division STANO communications network.

5-13. Communications

STANO information is reported to the division from subordinate elements by means of telephone, voice radio, and radioteletype. The division re-

ports to corps by means of telephone and radioteletype. Figure 5-6 illustrates a typical communications network which supports the STANO information system of the division.

Section V. BRIGADE

5-14. STANO Information Needs

a. As at the higher levels, essentially the same planning is carried out. Because of the size of the brigade and its area of interest, however, there will be a reduction in the number of operational plans and planning leadtime. Normally, operational planning at the brigade level is more dynamic than that at higher levels.

b. As at division, the brigade's surveillance requirements are characterized by the immediacy of operations. During fluid situations, continuous surveillance is required to obtain information on movements into or within the area of influence, disposition of enemy units and supporting weapons, electromagnetic emissions, nuclear detonations, CBR, and air threats. During static situations, periodic coverage of the area may suffice.

5-15. Organizational STANO Assets

Within the current organizational concept of the Army division, the brigade functions as a tactical control headquarters, with maneuver units and supporting elements attached or in direct support on a mission basis. For that reason, STANO assets are not organic to the brigade, but are attached or placed in support from organic or attached divisional assets when the brigade is task organized. An exception to this discussion is the separate brigade, which has the following organic STANO assets:

a. The armored cavalry troop of the separate brigade provides ground reconnaissance and surveillance through the employment of its ground reconnaissance elements. The troop is equipped with night vision devices, surveillance radar, and may be equipped with unattended ground sensors (see FM 17-30, 17-36).

b. The field artillery battalion of the separate

brigade provides surveillance and target acquisition capabilities through its forward observers and counter mortar radar (see FM 6-140).

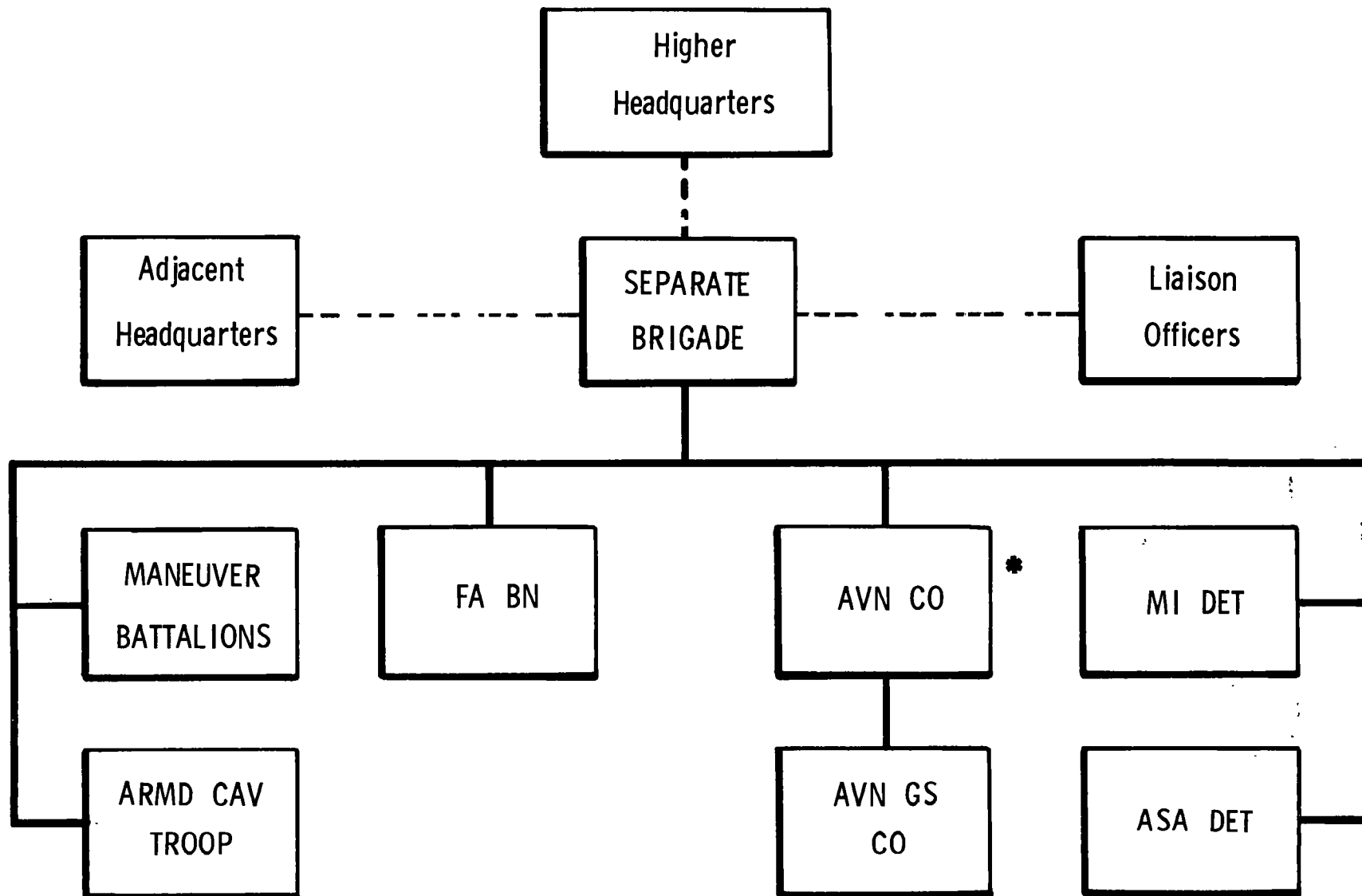
c. The military intelligence detachment of the separate brigade assists the S2 in the specialized fields of order of battle, imagery interpretation, interrogation of prisoners of war, document translation, and counterintelligence (see FM 30-9).

5-16. STANO Assets Available Through Attachment or Direct Support

Any or all of the assets listed above as organic to the separate brigade may be attached or in direct support of the divisional brigade, as required by the brigade's mission. Additional assets which are in support of the division from corps level may be further attached or placed in direct support of the brigade. Such units include searchlight platoons or sections (FM 6-115), and long range reconnaissance patrols (FM 31-18). The Army Security Agency detachment provides SIGINT, ECM, and ESM support to the separate brigade. Brigades within divisions receive such support from elements of the ASA Divisional Support Company. In providing this support, the USASA detachments and companies have direct access to capabilities of higher and adjacent echelon SIGINT/ECM/ESM resources.

5-17. Communications

The brigade communicates STANO information with subordinate elements by means of voice radio and radioteletype, and communicates with the division with voice radio, radioteletype, and telephone. Figure 5-8 illustrates the typical communications network at brigade level which supports STANO communications requirements.



LEGEND ——— Assigned or Attached
 - - - - - Support Available by Request
 * Separate Infantry Brigade only

Figure 5-7. Major STANO assets, separate brigade organization relationship.

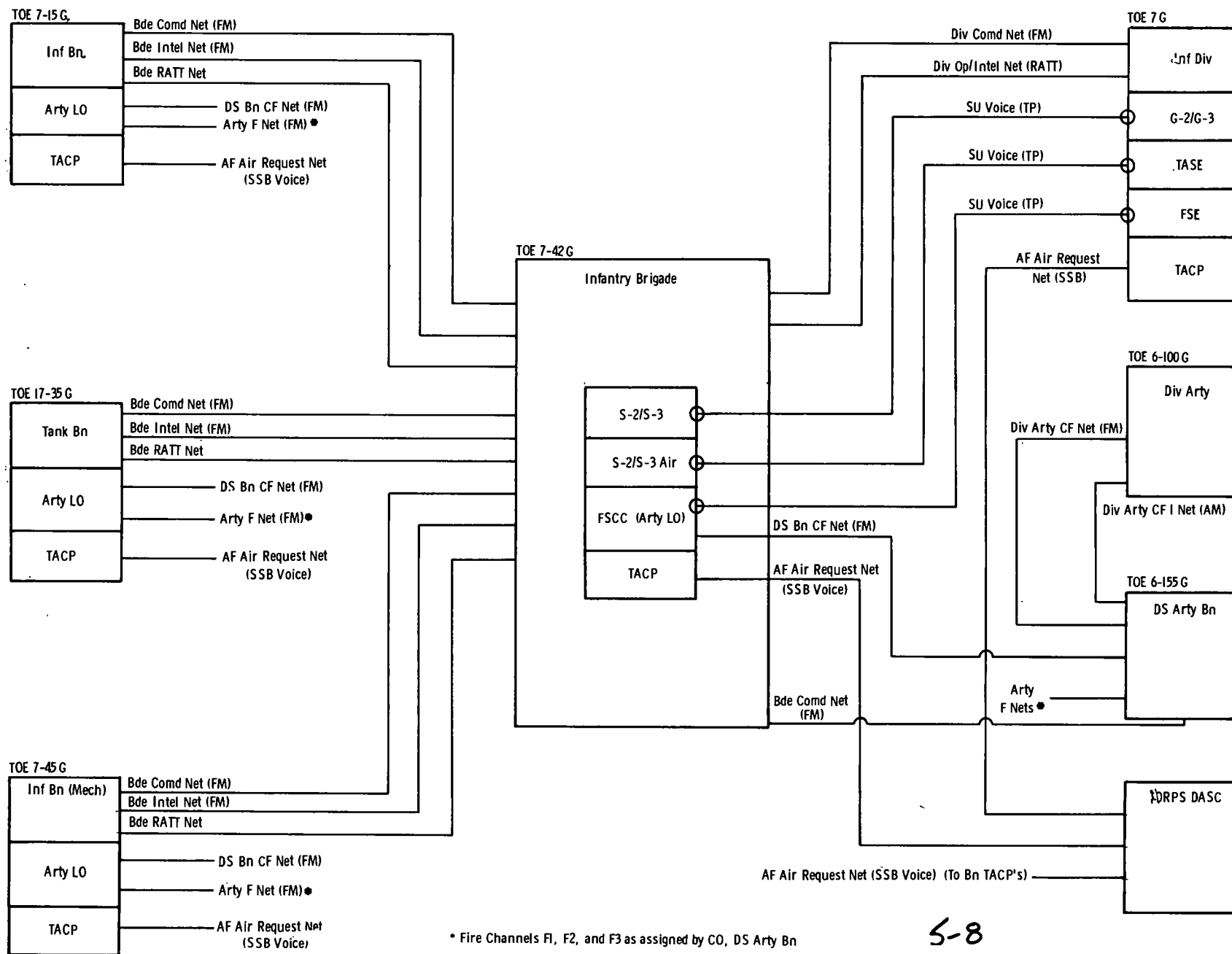


Figure 5-8. Typical Brigade STANO Communications Network.

Section VI. BATTALION

5-18. STANO Information Needs

The requirements for intelligence planning and surveillance within the battalion are essentially the same as those at brigade level, with a greater emphasis on informal planning, rapid planning, and continuous surveillance.

5-19. Organic STANO Assets

In order to meet its STANO information needs, the battalion has the following organic elements:

a. The battalion reconnaissance or scout platoon provides a ground reconnaissance and surveillance capability by means of patrols, listening posts, and/or observation posts. The platoon is equipped with night vision devices to assist in the performance of its missions.

b. The battalion ground surveillance section provides a ground surveillance capability for the battalion by means of its surveillance radars.

c. The forward observers of the battalion heavy mortar platoon provide a surveillance and target acquisition capability for the battalion.

d. In addition to the elements listed above, whose missions are primarily STANO oriented, a large amount of STANO information is generated by the companies of the battalion, and their capability to provide this information is a factor

which influences the commander's decision on the distribution of his forces.

e. See FM 7-20 and FM 17-15 for additional information concerning the organization and employment of the above units.

5-20. STANO Assets Available Through Attachment of Direct Support

Although any of the STANO assets of the division may be attached or in direct support of the battalion for a mission which requires such support, the only STANO assets normally found directly supporting the battalion are unattended ground sensor teams from the proposed division level UGS platoon and forward observers from the artillery battalion which is in direct support of the brigade. These forward observers accompany the companies of the battalion.

5-21. Communications

STANO information is normally received and disseminated between the battalion and its companies by voice radio. The battalion communicates with brigade by means of voice radio and radioteletype. A typical communications network which supports the battalion's requirements for STANO communications is shown in figure 5-10.

Section VII. COMPANY

5-22. STANO Information Needs

At the company level, STANO information needs are similar in nature to those of the battalion, but are characterized by the greatest degree of informality and rapidity in planning, and continuous surveillance by all means available.

5-23. Organic STANO Assets.

Within the company, STANO information needs are met through employment of the following elements:

a. The forward observers of the rifle company weapons platoon provide a surveillance and target acquisition capability for the rifle company (see FM 7-11).

b. The deployment of the rifle platoons of the rifle company or tank platoons of the tank company provides its remaining organic STANO capability. Both rifle and tank platoons are equipped with night vision devices, and tank pla-

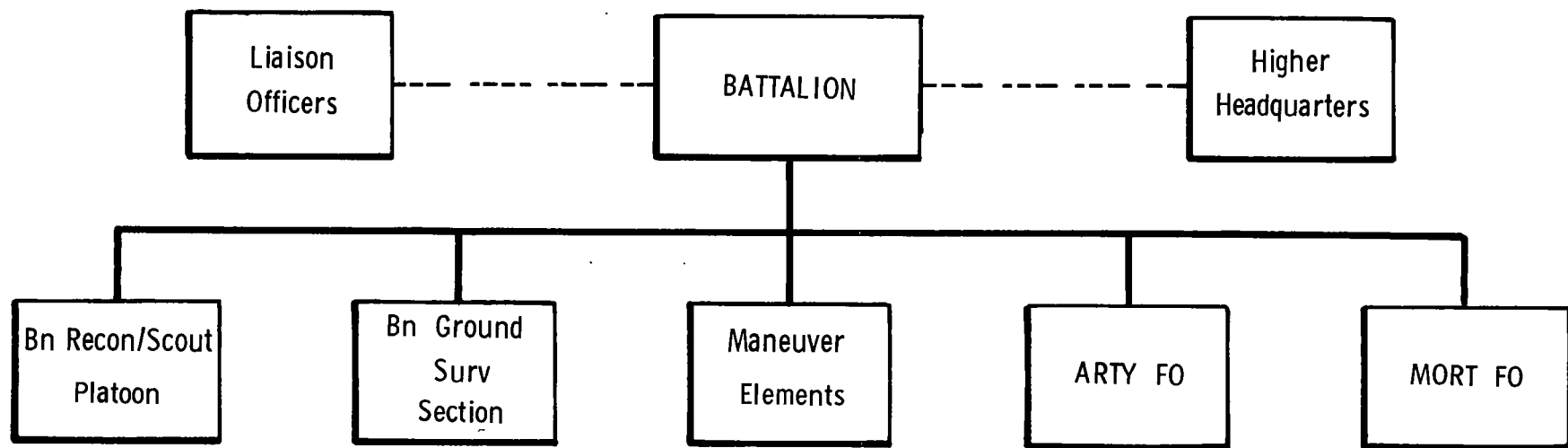
toons are equipped with illumination means (see FM 7-11, 17-15).

5-24. STANO Assets Available Through Attachment or Direct Support

Any STANO assets within the division which are capable of accompanying the company, and which may be secured by the company, may be attached or in direct support of the company when the mission requires such support. However, the only supporting STANO elements normally found at company level are—

a. A forward observer from the supporting artillery unit, and a forward observer from the battalion heavy mortar platoon assist in providing surveillance and target acquisition for the company.

b. Radar teams from the battalion ground surveillance section may be attached to the company to assist in providing surveillance.



Legend ——— Assigned or Attached
 - - - - - Support Available by Request

Figure 5-9. Major STANO assets, battalion organization relationship.

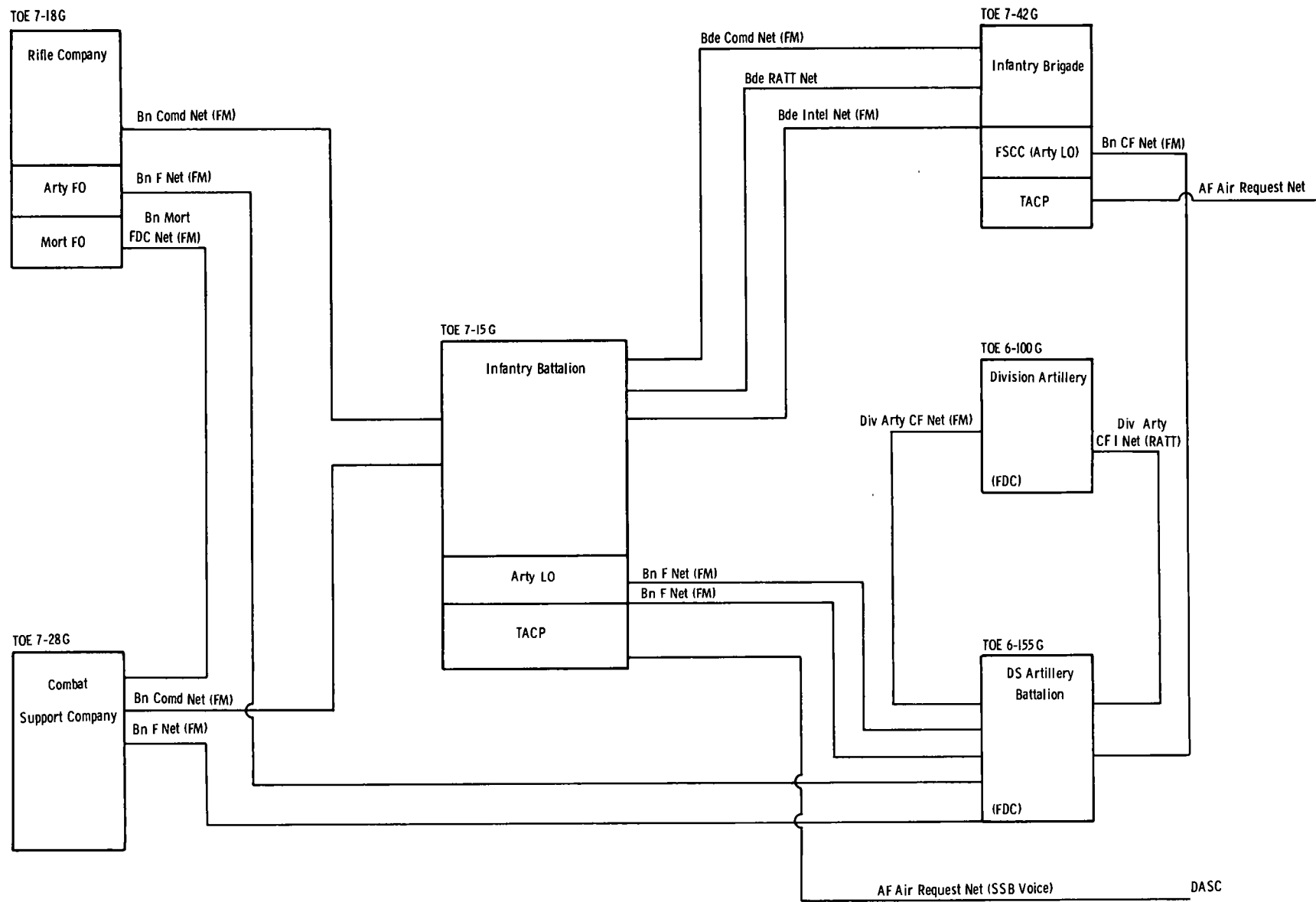


Figure 5-10. Typical battalion STANO communications network.

c. Elements of the battalion scout/reconnaissance platoon may be attached to provide an increased reconnaissance and surveillance capability. These elements are equipped with night vision devices to assist them in performing their missions.

d. Unattended ground sensor teams attached to the battalion may be further attached to the company.

e. See FM 7-20 and FM 17-15 for a discussion

of the organization and employment of the above elements.

5-25. Communications

The company receives and disseminates STANO information primarily by voice radio. The company typically operates a company FM command net, and operates within the battalion FM command net.

CHAPTER 6

STANO SUPPORT FROM OTHER SERVICES

6-1. Support by Tactical Air Force

a. Tactical air reconnaissance elements of the Air Force normally support both Army and Air Force intelligence requirements. Tactical air reconnaissance is one of the primary sources of intelligence information available to the Army commander for planning purposes and for support of immediate operational requirements. Tactical air reconnaissance units are capable of performing all missions within the entire spectrum of air reconnaissance, both day and night, and through most weather conditions. The Air Force normally provides a tactical air reconnaissance wing, consisting of three reconnaissance squadrons, in support of a field army. Normally, the reconnaissance wing will also have a reconnaissance technical squadron that has a photo processing and imagery interpretation capability. Usually, this capability is concentrated at the reconnaissance wing level; when required, however, personnel and equipment from this squadron may be collocated with one or more of the reconnaissance squadrons to provide direct support. The reconnaissance squadrons usually operate from improved airfields dispersed throughout the theater of operations.

Each squadron may be equipped to provide only a portion of the total reconnaissance capability (i.e., visual and photographic reconnaissance; infrared and radar reconnaissance; and collection of weather data and enemy electronic order of battle). Conversely, each squadron may be equipped to perform all those functions on a continuous basis, or to provide a major capability in one area and a limited capability in another area. The composition and mix of reconnaissance squadrons is the responsibility of the senior TAF commander.

b. In addition to providing aerial reconnaissance support to the Army, the Air Force also establishes the air defense early warning net within the theater of operations.

c. In the area of SIGINT and ESM, signal propagation and other factors may require that elements of the Air Force Security Service be

tasked for support supplemental to that available from supporting USASA elements.

6-2. Navy and Marine Corps Support

a. When Navy or Marine Corps air units provide the preponderance of air support to Army operations, operational procedures will be established by the joint force commander, but so far as possible, these procedures should follow general doctrine as presented in FM 30-20.

b. Navy and Marine Corps air reconnaissance units possess the necessary aircraft and imagery-producing sensors to accomplish the same types of missions as those performed by the TAF. These units also have an organic capability for processing and interpreting imagery returns.

c. In the area of SIGINT and ESM, signal propagation and other factors may require that elements of the Naval Security Group Command or a Marine Fleet Radio Battalion be tasked for support supplemental to that available from supporting USASA elements.

d. Dependent upon operational requirements and the volume of support being provided, Navy and Marine Corps imagery may be delivered to the land airbases at which the military intelligence battalion, air reconnaissance support (MIBARS) detachments are located. A portion of the MIBARS personnel, to include entire detachments, may be located aboard ship or at a Marine airbase to aid in processing and interpreting exposed imagery. If necessary, the MIBARS headquarters has the capability of creating a fifth MI Detachment (air reconnaissance support) (ARS) for special operations. In addition, a separate MI detachment (ARS), not organically part of an existing MIBARS organization, can be created to fill a special requirement to operate with a Navy or Marine air reconnaissance unit at the same time that the existing MIBARS organization continues to function in support of a TAF reconnaissance wing.

e. Navy and Marine Corps air reconnaissance units may require Army liaison officer support to be located with their flying elements. When

required, liaison officers can be procured by using imagery interpretation officers out of the imagery interpretation sections within MIBARS or out of the imagery interpretation section organic to the military intelligence organization in support of the Army combat units.

6-3. Unattended Ground Sensor Support Requirements

In the employment of unattended ground sensors, the Army has the following requirements for support from the other Services.

a. Aerial emplacement of sensors in areas beyond the range of organic Army delivery means, and in other situations where Army emplacement is impractical or inappropriate.

b. Aerial relay support in tactical air environments which preclude the use of organic Army aircraft as aerial relay platforms.

c. Aerial resupply of sensors and ancillary equipment to long range reconnaissance patrols, Special Forces elements, and clandestine agents when delivery by organic Army means is impractical.

CHAPTER 7

STANO IN SPECIFIC OPERATIONS

Section I. GENERAL

7-1. Introduction

The STANO doctrine presented elsewhere in this manual is essentially valid for all combat operations. Some specific operations, however, have special STANO implications which should be identified.

7-2. Types

Operations which fall within this area are Border Security/Anti-Infiltration Operations, Base Defense, Barrier and Minefield Monitoring, and Route and Convoy Security. The following sections contain a brief discussion of STANO considerations for some of these specific operations.

Section II. BORDER SECURITY/ANTI-INFILTRATION OPERATIONS

7-3. Materiel Considerations

STANO materiel used in border security operations supports two general border area requirements: isolated areas, where low population density, long border frontage, and natural terrain barriers make the construction of a manned systems unnecessary or infeasible; and areas, where high population density exists, and the border is relatively short, well defined and strategically important, and sufficient resources are available, make the establishment of manned systems feasible.

a. The isolated area system relies heavily on the use of remote sensors placed along avenues of known or likely infiltration. These sensors are unattended, capable of being spread over relatively large areas, and are usually "read out" by means of aircraft. In addition to unattended ground sensors, aerial sensors are widely used to discover avenues of infiltration. Ground patrols or forward operating bases use light radars and night vision devices to provide surveillance over areas of infiltration.

b. The manned systems use all appropriate STANO means to provide the greatest possible degree of surveillance. Particularly applicable to the manned system are devices which may be too heavy or difficult to emplace for normal tactical use, but which have a long life and are more reliable. Such devices include line sensors (e.g., balanced pressure sensors, infrared intru-

sion devices), the heavier radars and night vision devices, and illumination systems.

c. SIGINT and ESM may provide special and supplemental surveillance in border security/anti-infiltration operations.

d. See FM 31-55 (Test) for a more detailed discussion of materiel planning considerations.

7-4. Control

Control of STANO activities is usually more centralized for border security operations than for normal operations. This centralization is due to the influence of political constraints upon operations, and is also influenced by the fact that reaction forces are normally not available at the lowest echelons. Reaction in isolated areas is normally accomplished either by firepower or by airlifted forces, thus requiring the most rapid transmission of STANO information to the level at which control of these elements is exercised. Reaction in manned systems areas is influenced by the friendly population density and the fact that units manning the trace are strung out along wide frontages, both factors requiring that reaction be tailored and controlled from a relatively high echelon. STANO activities are controlled in a manner designed to insure the fastest possible receipt of information at the echelon controlling the reaction force. See FM 31-55 (Test) for a more detailed discussion of control considerations in border security operations.

Section III. BASE DEFENSE

7-5. Materiel Considerations

STANO materiel used in base defense supports two activities: detecting enemy forces approaching the base or setting up firing positions at a distance from the base, so that such forces may be dispersed by fires or ground attack; detecting enemy forces attempting to penetrate the base perimeter, so that these forces may be repelled by the fires of the perimeter security forces and reaction force.

a. The materiel used to detect an approaching enemy, or an enemy firing position, is similar to that used for isolated area border security. Unattended ground sensors are used in areas considered most likely to be used by the enemy; aerial sensors provide surveillance over the area surrounding the base; and patrols using lightweight radar and night vision devices provide surveillance over critical or suspected areas.

b. Materiel used to detect enemy penetration of the perimeter may include line sensors (e.g., balanced pressure, infrared intrusion device), ra-

dar, night vision devices, and illumination devices.

c. SIGINT and ESM may provide special and supplemental surveillance in base defense operations.

d. FM 31-36 (Test) contains further information concerning the use of STANO materiel in base defense.

7-6. Control

Control of STANO activities is normally centralized at the level which controls the reaction to enemy attempts to attack the base. This centralization is most commonly found at the base commander level. The base commander normally controls internal reaction to the threat, although higher echelons may control supporting fires. STANO activities are organized to provide the most rapid possible transmission of STANO information to the level at which reaction is controlled.

Section IV. ROUTE AND CONVOY SECURITY

7-7. Materiel Considerations

STANO materiel in route and convoy security is required to detect an enemy approach toward, or presence at, critical points on the route (e.g., bridges, culverts, or other defiles). To accomplish this detection, unattended ground sensors are placed at probable ambush sites and along approaches to critical points, aerial sensors provide surveillance of areas adjacent to secured routes, and patrols or security detachments use mounted or lightweight radars and night vision devices to detect ambushes or enemy forces approaching secured routes. Airborne personnel detectors may also be used in the detection of concealed enemy personnel. SIGINT and ESM may provide spe-

cial and supplemental surveillance for route and convoy security.

7-8. Control

Control of STANO assets supporting a route security or convoy security operation normally is exercised by the commander who also controls the reaction to the enemy threat. This may range from a convoy commander who controls the security detachment for the convoy, to a higher commander, who controls fire support and ground reaction forces supporting route security operations within a large area. STANO information reporting procedures are established in a manner which allows the most rapid receipt of information at the command which controls reaction.

Section V. BARRIERS AND MINEFIELD MONITORING

7-9. Materiel Considerations

Barriers/minefields are effective only when continuously monitored and when plans are made to interfere with hostile removal or penetration. STANO materiel can be used to assist in monitoring and detecting enemy approaches to the barrier/minefield or the presence of clearing parties. While light weight radars and night vi-

sion devices can assist visual OP's during periods of reduced visibility, unattended ground sensors provide a suitable means for remote monitoring of several barriers/minefields from a single location. In the latter case, sensors are placed along routes of approach, within the barrier or interspersed with the mines.

7-10. Control

a. Radars and night vision devices are employed with the observation posts and under the control of the OP commander. Radar teams are attached to the OP commander who directs their employment. Night vision devices will include weapons sights as well as observation devices issued directly to members of the OP party.

b. Unattended ground sensors are emplaced

by the unit constructing the barrier or emplacing the minefield. Readout devices are normally located at the CP of the commander charged with monitoring and maintaining the barrier/minefield. Direct communications are provided to a fire support element which has appropriate preplanned fire missions or to maneuver units having the mission to prevent or delay penetration of the barrier/minefield.



CHAPTER 8

STANO LOGISTICS

Section I. MAINTENANCE

8-1. General

a. The four basic categories of maintenance, (i.e., organizational, direct support, general support and depot), are applicable to the support of STANO equipment. Maintenance of STANO equipment is normally performed at the lowest echelon consistent with the skills, repair parts, tools and test equipment allocated to each category and with the time available. Maintenance responsibilities are prescribed for each category in maintenance allocation charts found in the technical manual pertaining to each item of equipment.

b. Maintenance functions to be performed by the various categories are influenced by the mission and location of supported and supporting units, nature of the support structure, readiness requirements, and the transportability and maintenance characteristics of the equipment involved.

c. Mobile contact teams will accomplish repairs on site when it is advantageous to supported and supporting units.

d. When, for any reason, an unserviceable STANO item cannot be repaired by the assigned maintenance category, the appropriate authority will direct its evacuation for repair by the next higher category. Such an instance is an exception to the rule. Normally, maintenance activities at the various categories will conform to prescribed allocations.

e. Controlled cannibalization, as outlined in AR 750-50, may be used as a source of repair parts and assemblies for the maintenance of STANO equipment.

f. Maintenance policies found in AR 750-1 and 750-5 are applicable to the maintenance of STANO equipment. The army's equipment records system as described in TM 38-750 applies.

8-2. Maintenance of Nonstandard, Developmental Items

a. In order to meet urgent operational requirements, STANO items may be issued to the field

prior to adoption as a standard item. They may be limited production items, or developmental items undergoing test and evaluation. These items are usually deployed before provision for their support can be incorporated into the normal maintenance structure in the field. Special provisions for maintenance support are therefore required until such time as the normal maintenance structure is capable of providing the necessary support.

b. Nonstandard developmental items are supported by new equipment training teams, Army technical representatives and contractor representatives who accompany the items to the field. The teams and individuals train military operators and maintenance personnel in support of the equipment during the early stages of deployment. Repair parts support is expedited by the establishment of high priority supply channels and procedures. As soon as the normal logistics support structure is able to assume responsibility for maintenance of the equipment, the special teams and individuals are withdrawn. This transfer of responsibility may be accomplished prior to adoption of the item as standard A.

c. See appendix B for the maintenance concepts for test equipment and special tools relating to unattended ground sensors.

8-3. Maintenance of Unattended Ground Sensors and Related Equipment

The maintenance concepts necessary to assure that unattended ground sensors within the Army are maintained in a ready condition are outlined in appendix B. The concepts contained therein pertain to the 1970-71 time frame. For subsequent periods logistical support for unattended ground sensors and related equipment will follow established conventional procedures.

8-4. Maintenance of Test, Measurement and Diagnostic Equipment (TMDE)

a. With the exception of equipment requiring

calibration by an army calibration company (see FM 29-27), direct support units are responsible for calibration of their assigned test and measuring equipment, and that of supported units (See AR 750-25). The frequency of maintenance calibration checks is established in pertinent technical manuals. Maintenance calibration checks require certification and documentation as prescribed in TM 38-750.

b. General and depot support maintenance units have responsibilities similar in scope to those of

direct support units, except that they normally repair TMDE for return to stockage rather than to supported units. General support and depot units accomplish maintenance calibration of repaired items as well as their own TDME.

c. The army calibration company performs secondary reference and transfer calibrations for units assigned to the field army. This company may also perform maintenance calibration as required.

Section II. SUPPLY

8-5. General

Essentially the supply system used for the support of STANO equipment incorporates the standard requisition, receipt, and issue procedures as set forth in AR 725-50 and the measures described in AR 711-16, for the Army field stock control. AR 735-35 is used to assist with property accountability, with FM 29-10, FM 29-10-1 (Test) giving valuable information on supply management in the field army.

8-6. Repair Parts Supply (Class IX)

a. At the direct support level, repair parts (Class IX supplies) are provided through maintenance channels. Suppliers are the direct support maintenance battalions at division support commands and the direct support units supporting nondivisional units.

b. At the general support level, repair parts, to include those parts of STANO equipment associated with aircraft, are provided through general support supply channels. The GS supply channels are established in general support units in the corps support brigade. Repair parts of STANO equipment associated with aircraft are handled at the general support level by the aircraft and missile repair parts supply company in the army support brigade, and by a platoon of the general support parts company in each corps support brigade.

c. Both direct support and general support units deal with the support brigade stock control center (SCC) during day-to-day supply operations, and with command headquarters on policy matters. Requisitions are placed directly with the support brigade SCC by the maintenance support units. The SCC releases stocks, if available, from one of the general repair parts companies. When repair parts are not available at any of the repair parts companies within the brigade, the SCC

transmits the requirements to the Field Army Support Command (FASCOM) Inventory Control Center (ICC). Replenishment of demands for supplies not within the resources of the FASCOM are placed upon the Theater Army Support Command (TASCOM) in the COMMZ.

d. Flow of requirements data and distribution of repair parts are described in FM 29-10, FM 29-10-1 (Test), and FM 29-45-1 (Test).

e. Direct exchange (DX) is encouraged for STANO repair parts, components, and assemblies. The DX system can be established as soon as there is sufficient Class IX parts in the system with trained maintenance personnel to support the density of the specific STANO equipment. The direct exchange system is discussed in FM 29-22.

8-7. Major End Items (Class VII)

a. Field stockage of STANO end items will take the form of shipments from the rear. Authorized stockage lists for Class VII items in the field army are subject to continuous review and will change as basis of issue (BOI) plans are developed and the STANO equipment has been field tested and evaluated. Class VII items in excess of authorized allowances and over which controls have been placed will normally be processed through command channels.

b. Operational readiness floats of selected end items of equipment and repairable components are stocked at maintenance activities such as DS units in order to have readily available serviceable stocks to provide to the user in cases where normal maintenance actions will create unacceptable delay in unit operational readiness. FASCOM will provide the guidance for the policies and procedures in the issue of operational readiness float stock, since it is a part of army reserve stock.

8-8. Unattended Ground Sensors and Related Equipment

This type STANO equipment requires exceptions to the supply support that has been related on the other STANO equipment in paragraphs 8-5

and 8-6. For the policies and procedures to be followed for initial supply of the end item and repair parts and replenishment of repair parts, requisition procedures, and shipment and control of repair parts and the end items, (app B).



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APPENDIX A

REFERENCES

A-1. Army Regulations (AR)

310-25	Dictionary of United States Army Terms (Short Title AD).
310-34	Organization and Equipment Authorization Tables: Equipment.
310-49	The Army Authorization Documents System (TAADS).
570-2	Organization and Equipment Authorization Tables—Personnel.
711-16	DSU/Installation Stock Control and Supply Procedures (Army Field Stock Control System).
725-50	Requisitioning, Receipt and Issue System.
735-35	Supply Procedures for TOE and TDS Units or Activities.
750-1	Maintenance Concepts.
750-5	Organization, Policies, and Responsibilities for Maintenance Operations.
750-25	Army Metrology and Calibration System.
750-50	Use of Controlled Cannibalization as a Source of Repair for Supply Augmentation.
755-1	Reporting, Utilization, and Redistribution of Installation, U.S. Army Materiel Command, and Overseas Command Excess Personal Property.

A-2. Field Manuals (FM)

1-15	Aviation Battalion, Group, and Brigade.
6-115	The Field Artillery Searchlight Battery.
6-120	Field Artillery Target Acquisition Battalion and Batteries.
6-121	Field Artillery Target Acquisition.
6-140	Field Artillery Cannon Battalions and Batteries.
7-10	The Rifle Company, Platoons, and Squads.
7-20	The Infantry Battalions.
17-15	Tank Units, Platoon, Company, and Battalion.
17-30	The Armored Brigade.
17-36	Divisional Armored and Air Cavalry Units.
17-95	The Armored Cavalry Regiment.
29-10	Supply Management in the Field Army.
29-10-1 (Test)	The Field Army Supply Management System.
29-22	Maintenance Battalion and Company Operations (Nondivisional).
29-27	Army Calibration Company.
29-30	Maintenance Battalion and Company Operations in Divisions and Separate Brigades.
29-45-1 (Test)	General Support Supply and Service in the Field Army.
30-5	Combat Intelligence.
30-9	Military Intelligence Battalion, Field Army.
30-20	Aerial Surveillance/Reconnaissance, Field Army.
31-18	Long Range Reconnaissance Ranger Company.

FM 31-2 (TEST)

31-36 (Test)	Night operations.
(C) 31-40	Tactical Cover and Deception (U).
31-55 (Test)	Border Security/Anti-Infiltration Operations.
31-81 (Test)	Base Defense.
(C) 32-5	Signal Security (SIGSEC) (U).
(S) 32-10	United States Army Security Agency in Support of Tactical Operations (U).
(C) 32-20	Electronic Warfare (Ground Based) (U). (Will supersede FM 32-20-1 (Test)).
(S) 32-20A	Electronic Warfare (Ground Based) (U).
101-5	Staff Officer Field Manual: Staff Organization and Procedure.

A-3. Technical Manuals (TM)

38-750	The Army Maintenance Management System (TAMMS).
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A-4. Department of the Army Training Circulars (TC)

3-16	Employment of Riot Control Agents, Flame, Smoke, Antiplant Agents, and Personnel Detectors in Counterguerrilla Operations.
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APPENDIX B

INTERIM DOCTRINE FOR UNATTENDED GROUND SENSORS

Section I. INTRODUCTION

B-1. General

Numerous references concerning the employment of unattended ground sensors (UGS) are found in this manual. This appendix provides the basic doctrine for the employment and logistics of UGS elements. The considerations presented here are adaptable to all units having a requirement to employ these devices.

B-2. Integration of Unattended Ground Sensors With Other STANO Assets

a. Properly utilized, UGS constitute a materiel resource for use by commanders as part of their total information gathering assets. To assist in the overall combat surveillance mission, UGS can be used to supplement and complement other information gathering media. Isolation of UGS into a separately managed program reduces the value to be gained from their use. Integration of UGS into the total battlefield surveillance and target acquisition plans is required at all echelons. These assets must be incorporated in the intelligence system to contribute to all other means of gathering information. Analysis of information derived from all means results in the production of intelligence which is disseminated to using units. Some of the information gathered may be of sufficient urgency and accuracy to be considered as target acquisition data, and commanders may act immediately on such informa-

tion. Additional intelligence will be produced by evaluating sensor derived information with that gathered through other means. Further, interservice exchange of intelligence may result in significant gains in total knowledge of enemy activity.

b. Unattended ground sensors may be delivered by air, artillery and/or mortars into areas which, due to terrain or the tactical situation, preclude the hand emplacement of UGS. These delivery means enable UGS to be used along difficult-to-reach routes, and in enemy rear areas where manned surveillance systems cannot survive.

c. By effectively employing unattended ground sensors in conjunction with other surveillance means, an economy of force measure can be achieved. This is accomplished by deploying forces in direct relationship to known factors or by massing firepower. This capability offers commanders potential gains in their ability to successfully accomplish combat missions without undue commitment of forces. UGS produce information which indicates the presence of activity at a particular place and time. By comparing these detections with other information, determination can be made of whether the activity is friendly or enemy. Reaction to activities determined to be of enemy origin may be made by any appropriate means available.

Section II. EMPLOYMENT

B-3. Unattended Ground Sensor Roles

UGS may be employed in three basic roles which are not bound by offensive or defensive considerations nor by specific operational environments. Specific tactical applications are discussed in paragraphs B-15 through B-19. The basic UGS roles are—

- a. Alerting or warning role.
- b. Surveillance role.
- c. Target acquisition role.

B-4. Echelons of Employment

a. The employment of unattended ground sensors in the above roles does not restrict their employment to any given echelon. The physical characteristics of devices currently available, in addition to other factors not discussed here, make the organization of a division level unattended ground sensor platoon desirable. This platoon provides monitor teams and sensors for employment at maneuver battalion level. Although employ-

ment of UGS at the maneuver battalion level is stressed throughout this document, the doctrine is applicable to all units in their UGS employment operations. Employment at the maneuver battalion level is stressed because the battalion has the ability to react promptly to UGS derived targets. The requirement for timely information is greatest at and below this level, and at the maneuver battalion the integration of UGS data and other information can result in meaningful, timely intelligence. The employment of UGS in the target acquisition role by either the maneuver element commander or the artillery commander is highly desirable.

b. To the extent practicable, the echelon which makes use of the information should emplace and monitor UGS. The employing echelon may at times require emplacement, relay or monitoring support within its area of interest from other resources of the force. In operational environments in which a negligible enemy air defense capability exists, Army aviation provides delivery and aerial relay support when required, to the employing/monitoring echelon within its area of interest.

c. Information desired from other service sources (to include other service delivered and monitored UGS systems) should normally be requested in the form of specific essential elements of information. Responsiveness is a critical element of other service UGS information support. There are specific instances when other services deliver UGS for Army monitoring, (e.g., to support long range reconnaissance patrols). In these cases, support request procedures should conform to those specified in FM 30-20, FM 30-5 and FM 30-9. UGS delivered by other services are monitored by either the requestor, the deliverer, or both. Procedures for requesting Air Force aircraft for unattended ground sensor support will be the same as prescribed for preplanned TAC air and will normally be initiated by brigade or higher echelons.

B-5. Tactical Employment

a. Unattended ground sensor surveillance equipment can be used in many different ways to support combat operations. The UGS have tactical application in all types of combat operations and special surveillance missions. The techniques for UGS employment are similar in offensive and defensive operations. In both, friendly forces employ UGS in the alerting or warning role, the surveillance role, or the target acquisition role. Combat operations discussed in this section are

representative only, and the principles apply to all similar operations.

b. Unattended ground sensors must be integrated into the overall information collection plan. Each individual situation must be analyzed and UGS used where the anticipated additional information they can produce is commensurate with the required expenditures of manpower and resources. The variety of types of UGS available offers flexibility in selection of sensors for each application. Flexibility is offered within each type UGS by differences in size, range, and operational mode.

c. UGS are categorized according to the means of detection utilized and according to the method used to emplace the sensor in its operational location. The detection means include seismic, acoustic, infrared, pressure, disturbance, electromagnetic, and magnetic. The use of two or more types of UGS in the same area, (e.g., seismic and magnetic), increases the reliability of the detections by reducing the false alarm rates and enhances the solution of the identification problem.

d. Methods of emplacement include hand-emplacement, air-delivery (from either fixed or rotary wing aircraft) and ballistic delivery by mortars or artillery.

B-6. Offensive Operations

a. *General.* UGS are used in offensive operations to locate the enemy in order to bring him under attack. The sensors are emplaced in locations where the enemy is believed to be deployed tactically or in areas through which he is expected to move. When the enemy's presence is detected, pre-planned actions are initiated. Offensive operations visualize emplacement of strings of UGS, prior to the start of the operation, across the most probable avenues of enemy withdrawal. Plans are also made for the emplacement of secondary strings of UGS as the situation develops. Planned reaction measures are initiated when the location and direction of enemy withdrawal are determined. Determination of the enemy's location and direction of withdrawal can be assisted by pre-planned emplacement of UGS. It is desirable that the UGS emplacement, monitorship, and reaction strike force systems all be under the control of the ground force commander responsible for the overall operation.

b. *Ambush.* The ambush offers a friendly unit an opportunity to inflict maximum damage on the enemy with minimum casualties to friendly

forces. Remotely fired munitions may be used in combination with hand-emplaced UGS. Command detonated mines can be emplaced to cover the kill zone, and when the UGS indicate the presence of a suitable target the mines are detonated. When the UGS are emplaced with sufficient accuracy, artillery offers an ideal method of attacking the target. A variation of this application involves the use of UGS to alert an ambushing force of approaching enemy. Sensor derived information can enable the ambush force to determine the optimum time to open fire, or provide a warning or activity on an unprotected flank.

c. Landing Zone Monitoring.

(1) Under certain tactical conditions, a commander may elect to preserve the element of surprise by making an airmobile assault landing without firing a pre-assault preparation. UGS are emplaced at probable enemy positions adjacent to potential landing zones and on probable routes to the landing zones prior to the operation. They are monitored until the actual airmobile assault. Information gathered by the sensors is used as a basis for deciding whether or not to execute the landing, whether or not to fire a preparation, and for selection of the specific landing zones to be used.

(2) Enemy mining or positioning of forces in the vicinity of suspected landing zones as a deterrent to airmobile assaults must be considered when planning such operations. The skillfull emplacement of acoustic and/or seismic UGS devices in the vicinity of the landing zones can provide the ground commander with timely early warning of enemy activity which he could use to gain a tactical advantage and possible reduction or elimination of casualties to friendly forces.

(3) If multiple landing zones are being monitored, the commander must consider the tactical situation prior to selecting the one most suitable for the assault landing of his force. It may be his decision to land his force in a landing zone where UGS reports have indicated enemy activity, if the tactical situation dictates.

d. Objective Monitoring. Offensive operations may be oriented on either terrain or enemy forces. When terrain objectives are designated, intelligence planning should include use of UGS. Emplacement of UGS on the terrain to be captured and along possible routes of approach or withdrawal affords a capability for providing the commander with timely and increased intelligence upon which to base his decisions.

B-7. Defensive Operations

a. General. UGS are used in defensive operations to determine the location and direction of approach of the enemy. UGS are employed along likely avenues of approach and in probable assembly areas to gain advance warning of an enemy movement. Reference to FM 31-55 (Test) and FM 31-81 (Test) may be used in addition to the guidance published herein.

b. Base Area Defense. UGS are used in base area defense to supplement other means of surveillance. A combination of various types of UGS can be installed around the perimeter of an area in an arrangement tailored to the terrain, vegetation, soil composition, and tactical situation. The use of UGS is coordinated with sentries and other detection systems and is integrated with barriers and defensive fires into an overall defense plan. UGS with a long operating life are most appropriate for employment in this application.

c. Extension of Listening/Observation Posts. UGS may be used to extend listening/observation post capabilities. Manpower limitations in a tactical situation often preclude the establishment of listening/observation posts in the desired quantities or locations. Seismic sensors, paired with other types of UGS for confirmation of detections, can be hand-emplaced as soon as it is dark enough to conceal activities. They can also be emplaced ballistically or by air to gain greater coverage and additional reaction time, or to reach otherwise inaccessible areas. UGS may be used to enhance flank security provided by contact patrols and flank security elements. In a defensive position, UGS may be used to supplement contact patrols in covering gaps and to augment flank security protection or to monitor barriers and minefields.

d. Convoy Security. Ambush detection for convoys can be provided through UGS. Several days prior to the use of insecure routes by large convoys, seismic and acoustic sensors can be emplaced in the most likely areas suited for ambush by the enemy. The UGS can be controlled by the commander responsible for convoy security. Upon receiving an indication of enemy activity, the convoy can be alerted and the enemy ambush force attacked by fire and maneuver as appropriate. Long term surveillance of frequently used routes can be provided by use of UGS which can be activated and deactivated upon command.

B-8. Special Surveillance Missions

a. General. There are situations in which the objective is either to acquire information regarding a pattern of enemy activity, or to monitor enemy activity within an extensive area. These are primarily surveillance missions, although the intelligence produced in many cases may be applied directly to offensive and defensive operations.

b. Area Surveillance. One problem in counter-guerrilla operations is preventing the enemy from moving back into a base area after it has once been cleared by friendly forces since it is not always possible to destroy the base area and render it completely unusable. It is also usually impractical to leave troops in the base area to prevent enemy re-entry. The result is that frequently base areas are cleared only to be reoccupied by the enemy a short time later. Though UGS will not keep the enemy out of the area, they can be used to monitor the base area and provide information of renewed enemy activity. Strings of UGS may be left behind by friendly troops across probable avenues of approach into the enemy base area. These UGS are monitored to obtain information on the amount and direction of the enemy movement in and around the base area and to provide the basis for necessary action.

c. Route Surveillance. UGS can be used to monitor infiltration routes and to establish patterns of enemy activity. Use of appropriate UGS mixes enables traffic to be monitored over a variety of routes such as roads, waterways, ridgelines, and natural defiles. UGS can be used throughout a network of enemy infiltration routes in border areas to monitor enemy movement and develop information for use in planning offensive actions.

d. Physical Security. Use of UGS in rear areas, around logistics storage areas, prisoner facilities, command posts, and munition storage areas, or radio relay sites provides a significant economy of force capability to commanders. Although security forces must usually be maintained, the size of these forces can be smaller than those required when UGS are not used. As in other sensor applications, use of various combinations of devices affords the best means of detection and identification. Preparation of a complete security system includes land mines, wire, UGS, field fortifications, fields of fire, and reaction forces.

e. Tunnel Monitoring. Application of UGS can be made in tunnel monitoring missions. This use is restricted by the physical requirement that the tunnel entrance be monitored, resulting in point target surveillance. It is usually difficult to predict paths of movement by the enemy to and from the tunnel. When only a single UGS is employed because of the above restrictions, the number of personnel present in a tunnel cannot be determined; however, the information that a tunnel is in use is of some value in itself. It is possible that surface monitoring above underground routes could be accomplished, depending on the depth of the tunnel and ability to determine directions and locations of the tunnel route.

f. Countermining Activities. Use of UGS to maintain surveillance of frequently used routes, lines of communication, pipelines and MSR's can significantly affect the enemy's capability to employ mines and boobytraps to interdict supply routes or to restrict movement in and out of base areas. UGS employment in this application can reduce the commander's requirement for time consuming route clearing operations prior to movement.

B-9. Limitations on UGS Use

The number of possibilities for employment of UGS in route and area surveillance roles is limited only by the user's imagination. The inability of an UGS to distinguish between the "signature" of a military target and the same signature presented by a non-military target results in the sensing of the non-military target. The sensing of animals, moving foliage, rainfall, or aircraft over-flights are examples of "false alarms." When UGS devices are employed in tactical operations, the effect of possible false alarm sources within the contemplated area of operation must be carefully considered. Ground forces operating in remote areas away from most sources of false alarms such as other electronic equipment, construction equipment, low flying aircraft, vehicular traffic, animals, and friendly inhabitants will have the greatest opportunity to exploit the potential of UGS devices. When operating in or near populated areas, the false alarm rate could be so high as to preclude most operational uses of these devices. Vulnerability of UGS systems to SIGINT/ESM and ECM is covered in paragraph 4-1c.

Section III. ORGANIZATION AND CONTROL

B-10. General

a. UGS management and general employment guidance is a command responsibility. The UGS system must provide accurate and timely information at the echelon where combat forces can react decisively to take full advantage of the information. The equipment may be used tactically by units varying in size from small independent patrols through major divisional elements. Coordination of UGS operations is normally accomplished by staff intelligence officers. Close coordination at joint and combined staff level is required in order to attain maximum benefit from all UGS operations by the Services and host country forces.

b. Selection of UGS locations, determination of methods of employment, and decisions concerning the action to be taken based on sensor information should normally occur at the lowest level consistent with requirements for centralized control (e.g., limited availability of UGS or communications resources). Control at battalion level greatly reduces reaction time and permits screening of UGS information prior to the introduction of the information into the brigade and higher intelligence system. A requirement for more centralized control of UGS may result from electromagnetic frequency control considerations. This factor is discussed further in paragraph B-12.

c. UGS requested by subordinate headquarters are allocated based on priorities established by the commander. The establishment of priorities by the commander would include consideration of the availability of UGS in the command, the overall threat environment, and the planned operations of other command elements.

B-11. Organization

a. Each command level within a theater of operations organizes staff activities according to the level of intelligence activity being conducted. Normally, staff relationships remain unchanged for UGS application. Typical responsibilities of G2 or S2 staffs include the following:

- (1) Supervision of intelligence collection efforts, including employment of UGS.
- (2) Planning for orderly acquisition, processing, and dissemination of intelligence.
- (3) In coordination with the G3/S3, planning for employment of UGS in target acquisition roles.

(4) Determining geographical areas of possible employment of UGS.

(5) Monitoring and assisting in preparation of employment requests.

(6) In conjunction with the G3/S3, coordinating technical and tactical training for combat units.

(7) Reviewing and consolidating reports.

(8) Maintaining required records.

(9) In coordination with the G4/S4, maintains cognizance of the readiness and logistic problems of UGS.

(10) Coordinating actions with other staff members.

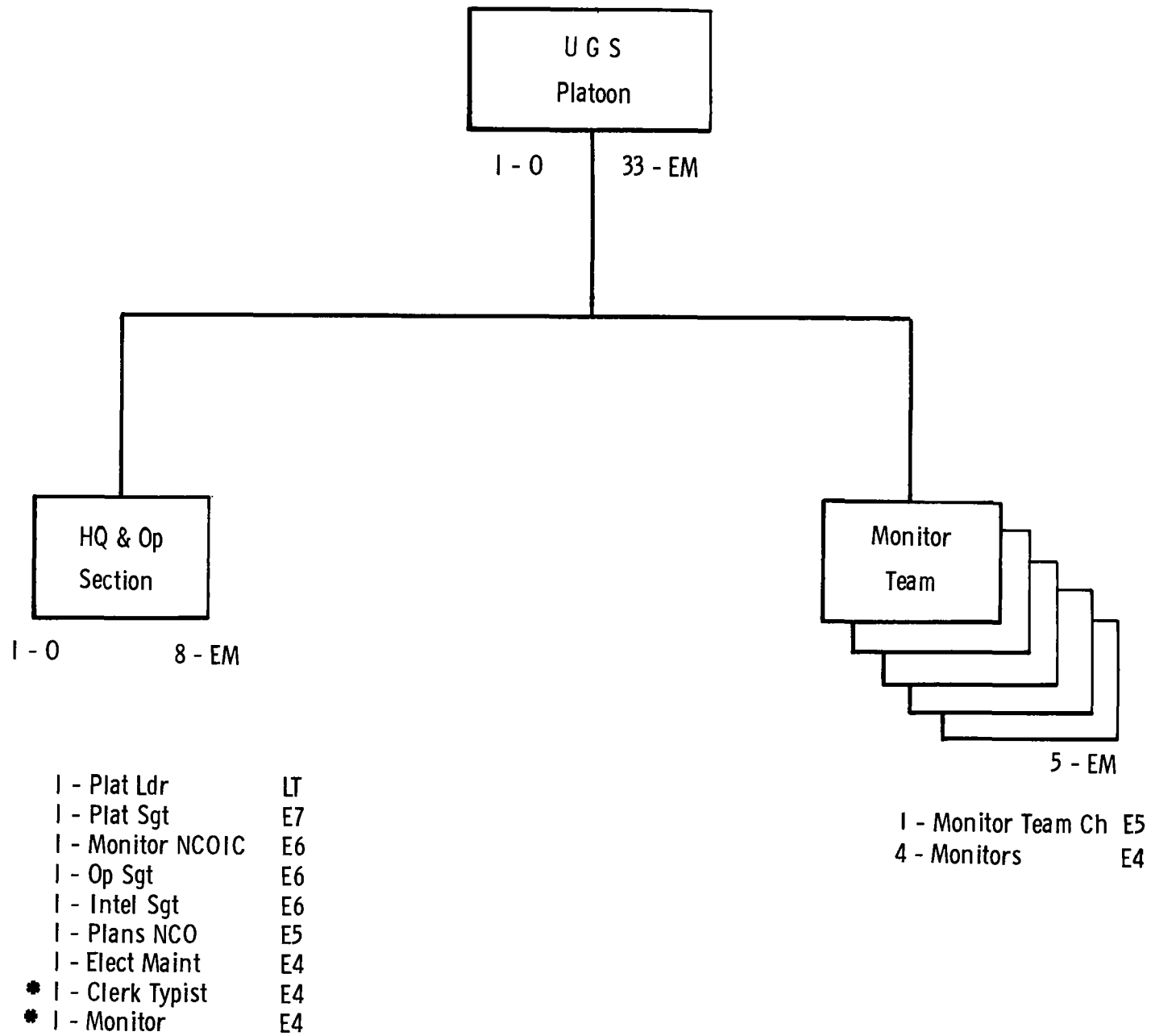
b. The physical characteristics of unattended ground sensors currently available makes the organization of an unattended ground sensor platoon at division level feasible. The platoon is assigned to the division headquarters and headquarters company and operates under the staff supervision of the G2. The proposed organization of the platoon is shown in figure B-1.

(1) *Platoon Headquarters.* The platoon headquarters provides command and control of platoon activities, plans for the emplacement of UGS fields, performs organizational maintenance of UGS equipment, and assists in insuring the supply of UGS to sensor teams.

(2) *Monitor Teams.* Monitor teams monitor UGS fields on a 24-hour basis. They evaluate UGS activations and pass the information derived directly to the supported unit. Personnel are capable of emplacing and monitoring UGS and giving instruction on sensor monitoring and emplacement to the supported unit.

B-12. Communication and Frequency Management

a. Rapid communications (land line and/or radio) should be established as necessary to support the UGS employment effort in order to reduce response time. Existing command, area, and organic communications systems are employed for gathering and disseminating information gained from employment of UGS. Sole user circuits may be designated when required. Communications connecting monitor operators to the tactical operations center (TOC) or fire direction center (FDC) are established according to command preference. Locating the monitor stations within or near the TOC is desirable to facilitate



* Also Lt Trk Dvr

Figure B-1. Division unattended ground sensor platoon.

response and reduce requirements for additional communications.

b. Frequency control and frequency management procedures are command responsibilities and are discharged at theater or equivalent staff level. Efficient use of available frequencies to support the use of UGS is dependent upon proper planning at the highest command levels. The systems effectiveness of the UGS devices will be a function of the commander's ability to control and manage the frequencies utilized by the unattended ground sensors. Frequency interference is resolved at the lowest possible echelon. Below theater level, frequency management including that for UGS is under the general staff supervision of the ACSC-E or C-E officer. The limited numbers of frequencies available may restrict freedom of UGS usage and require centralized control.

c. Special attention should be given to communications security of radio links associated with unattended ground sensor operations. Radio communications from the monitoring stations can, if unsecured, provide information to the enemy on the identity, location, and planned actions (e.g., fire missions) of friendly forces, as well as provide the enemy with insights into our knowledge of his locations and activities which may enable him to take evasive action. Furthermore, lack of proper precautions can provide the enemy with opportunities for collecting electronic warfare support measures (ESM) data to target his electronic countermeasures (i.e., jamming and deception).

B-13. Intelligence

a. Planning. In planning operations, the employment of UGS is included in the overall collection plans at all echelons. Effective use of UGS systems must be directly related to both the friendly and enemy tactical situations. Planning for the use of these devices requires an analysis of both the current and predicted situations and other collection capabilities. From this analysis will come recommended areas for UGS emplacement, selection of an appropriate employment plan, and determination of equipment requirements. Coordination of the projected UGS employment with the sensor operations underway in adjacent and supporting units must also be considered during the planning phase.

b. Collection. UGS devices should be employed to complement other intelligence collection means. Skillful and accurate emplacement of

UGS in areas where enemy activity is anticipated or suspected may be the only means of gaining certain critical real time information.

c. Processing of Information. All information should be processed at each echelon in conjunction with current friendly activities and other collateral intelligence. Battalion level efforts are the key to insuring timely, accurate acquisition of intelligence. The intelligence gained is highly perishable and requires immediate action in many instances.

d. Dissemination of UGS Information/Intelligence.

(1) Raw data regarding sensor activations is not disseminated outside the monitor team. The monitor team analyzes the raw data obtained from the monitoring equipment and translates it into intelligence information, (e.g., personnel on foot by estimated numbers, rate and direction of movement, geographic location; vehicle column, estimated numbers, rate and direction of movement, etc.).

(2) Dissemination is usually not a problem at lower echelons since communications can usually be made immediately by voice radio. Information collected should be handled as spot reports on the operations/intelligence nets in the same manner as other information. Standard report formats may be prescribed by unit SOP to facilitate reporting. Dissemination of intelligence from higher echelons must be expedited to overcome delays imposed by heavy message traffic and staffing requirements.

(3) In order to insure rapid response from artillery fire support, direct communications should be maintained between the monitoring location and the artillery unit.

e. Security.

(1) Provisions should be made for destruction of monitoring equipment in the event capture is imminent.

(2) Reports of jamming, equipment loss, or compromise should be submitted through intelligence channels by the fastest means available.

B-14. Fire Support

a. The effectiveness of unattended ground sensors employed in target acquisition roles depends largely upon the ability of the employing unit to deliver timely and accurate fires into the area in which enemy activity is detected. The locations of UGS must be closely coordinated with fire support agencies to ensure that they are, in fact,

within the engagement capability of one or more of these agencies.

b. UGS employed as target acquisition devices will be restricted to those sensors or combinations of sensors which can accurately locate in two dimensional coordinates and can identify the detected target at least as hostile, or its probability of being hostile. In special situations where free fire areas (low intensity conflict) or specified type targets are involved, or where the sensors are well within enemy lines, hostility may be assumed even though UGS are not capable of target identification. In these applications, UGS are accurately emplaced in appropriate areas through which enemy forces may pass or in which they might be located.

c. UGS devices which can be emplaced accurately offer the distinct advantage of permitting the delivery of timely and effective unobserved

fires into the target area. This can be accomplished by planning artillery concentrations on or in the vicinity of the UGS. These type missions should not be limited to ground-based artillery and mortars, as there may be many situations in which it is more advantageous to use armed helicopters, naval gunfire or close air support.

d. Reports from UGS which have not been located accurately will require supplemental reports from radar and/or other surveillance devices to verify locations if the delivery of unobserved fire is desired.

e. When a unit commander desires to have allocated UGS emplaced by artillery or mortars, he specifies the delivery requirement in a request to the delivery unit through established fire support channels. Requests for Army aviation support are handled in the same manner as for other aviation support requests.

Section IV. LOGISTICS

B-15. Maintenance Allocation

a. Commanders authorized unattended ground sensors will stress the need for good maintenance and, when possible, recovery of sensors for re-use or salvage, because of the high cost of the devices. Although some maintenance responsibilities have been placed in the organizational category, repair will be limited as stated in the applicable technical manual. Tools and test equipment to maintain these devices will be authorized and issued only to the theater direct support (DS) central control point concurrent with the authorization and issue of the devices.

b. For the 1970-71 time frame, modifications to the normal logistical chain are made requiring special logistic channels and procedures for unattended ground sensors and associated equipment. The only in-theater maintenance required beyond the organizational level is to be accomplished at a limited number of centralized points where direct support (DS) maintenance facilities and trained personnel exist. CONUS depot and contractor owned facilities will be used on a retrograde shipment basis for more extensive repairs.

c. Equipment will be supplied from CONUS locations to the designated DS unit in the overseas theater. DS units will uncrate equipment, assemble, test, replace components and repair if necessary and, as requisitioned, issue to using organizations. Using organizations will have copies of the instruction books furnished with each unit

of equipment, containing operating instructions, procedures to determine if it is operating properly, and certain limited (external cleaning and battery replacement) information on field care. Using organizations will evacuate unserviceables through normal division support command supply channels, who in turn, will coordinate further evacuation to the designated theater direct support UGS facility. Direct exchange of major assemblies and components will be made from float stockage retained at the specifically designated theater direct support UGS facility. These designated DS maintenance facilities with certain levels of repair parts available will repair the equipment and return it to stock for reissue or unrepairable items will be evacuated to the designated CONUS depot or contract facility.

d. In-theater UGS maintenance is limited to the replacement of major subassemblies, selected repair parts, cables, connectors, batteries, and verification that the assembly replacement has restored the item to satisfactory service.

e. Radio sets, ancillary equipment, test sets, battery chargers, are nonconsumable, recoverable items. Maintenance of this type equipment is normally performed by divisional DS units in accordance with the published maintenance allocation charts (MAC).

f. Incoming materiel received from vendors and CONUS supply points will be inspected and tested as soon as possible by the central control point where the theater direct support facility will be

jointly located. Assembled devices must be tested using the appropriate read-out device; components will be tested with "go-no-go" testers developed for the purpose. Proper diagnostic testing and inspection is the responsibility of all categories of maintenance, and plays a predominant role on those devices recovered from tactical operations. Therefore, the performance of the testing is accomplished at the lowest support level of maintenance capable of returning the equipment to a serviceable condition.

g. The repair and/or replacement of unserviceable assembled devices and their associated assemblies will be effected as follows:

(1) Unserviceable assembled devices will be repaired by the replacement of repair parts as indicated in the maintenance allocation charts of the published TM.

(2) Unserviceable recoverable repair parts (i.e., assemblies and subassemblies) will be replaced and/or repaired only at designated theater direct support repair facilities.

h. Rebuild will be accomplished only in designated CONUS facilities.

B-16. Categories of Maintenance

Modifications to the standard categories of maintenance for the 1970-71 time frame are as listed below.

a. Operator/organizational maintenance will be limited to performance of preventive maintenance in accordance with the applicable technical manual or manufacturers technical publication necessary to maintain system readiness.

b. Direct support maintenance will be performed by a designated DS facility. This category of maintenance will be limited to the test and replacement of major assemblies and subassemblies in accordance with maintenance instructions for each item. Items repaired will be returned to stock (consumable items) or to the user (nonexpendable items). Unrepairable items will be evacuated to the designated CONUS depot or contractor facility.

c. General support maintenance will be performed in CONUS.

d. Depot maintenance will be performed at the designated CONUS depot or contractor facility. Depot maintenance activities will have the capability to test components; assemble and test complete devices; perform diagnostic testing; and repair assemblies, subassemblies, test sets, and other ancillary devices. All rebuilding will be performed at depot level.

B-17. Maintenance Concepts for Test Equipment and Special Tools

Special tools, test and support equipment authorized by the appropriate technical manual for the performance of maintenance at the organizational and direct support level will be repaired by the designated depot or contractor facility.

B-18. Supply

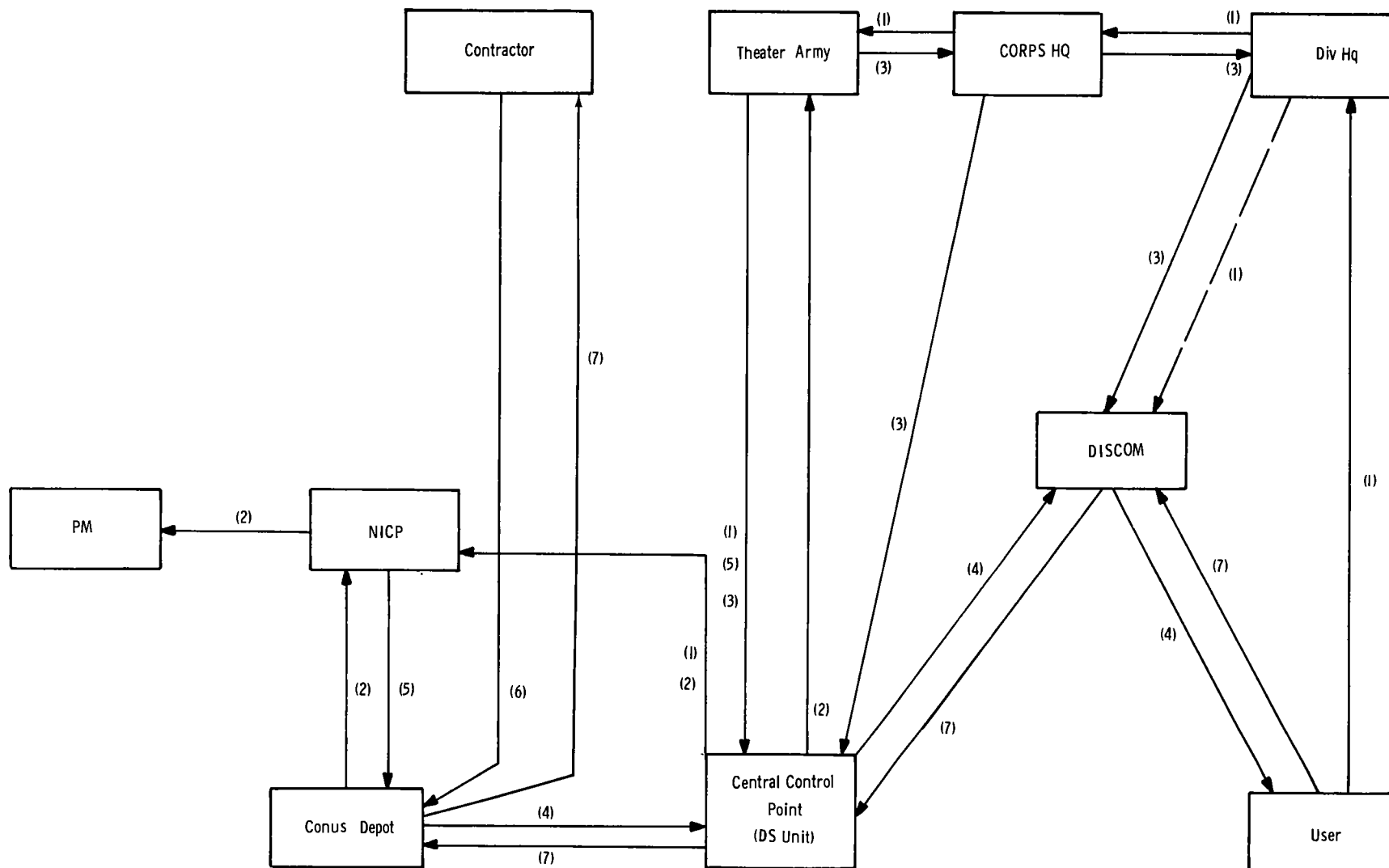
a. End item allocation will be as published in Basis of Issue Plan. Distribution of complete end items, sensor cases, and the initial allocation of common modules will be made automatically, and no requisitions are required. Follow-on requirements for common modules will be submitted as requisitions in accordance with AR 711-16 and AR 725-50. Requisitions by using units for unattended ground sensors will cite a priority designator code commensurate with the urgency-of-need. Requisitions are honored at theater army level based on the current or future needs of the unit. Shipment priorities from the central control point to the using unit are by date/time group, (i.e., earliest requisitions will be processed for those units with the highest priority). The division G4 will ascertain, by coordination with the G2/G3, the allocation of unattended ground sensors to brigade and battalion sized units. The G4's guidance will be directed to the division support command, specifically the supply and transportation battalion for receipting, storing and issuing of major end items of unattended ground sensors and related equipment.

b. Repair parts to support all items will be automatically distributed to central control points designated to provide support for each type of equipment. An estimated 3-months' supply will be issued as required by the appropriate technical manual or the repair parts list as established by ECOM and MECOM for each item. Additional repair parts required thereafter will be requisitioned from designated CONUS supply points. Detailed requisition procedures will be prescribed by USAMC. Figure B-2 illustrates a typical sequence of events from delivery by the contractors to employment by the user.

c. Issue of assembled devices should be made by unit distribution whenever possible in response to validated requisitions.

B-19. Care and Preservation

Environmentally controlled storage is required for dry cell batteries, pyrotechnic devices, and ammunition items in order to minimize deterioration. Stocks on hand in theater should be kept at



- (1) Requisitions (requirements)
- (2) Availability (on hand and due-in)
- (3) Issue authority (recalculated by each command headquarters for subordinate units)
- (4) Issues
- (5) Materiel release order
- (6) Delivery of components
- (7) Return of unserviceables

Figure B-2. Typical logistical support system.

a minimum consistent with operational requirements to reduce demands on storage facilities.

Items placed in storage should be preserved—
packaged and packed Level A.



GLOSSARY

STANO—An acronym for Surveillance, Target Acquisition and Night observation. It is comprised of those means and materiel organic to or in support of the Army in the field (to include other services) associated with information gathering and presentation capabilities utilized to find the enemy or facilitate night operations.

Night Observation Aids—Equipment and/or techniques used to enhance observation at night.

Observation—The examination or study of terrain, weather, personnel, structures or activities to obtain information of military significance.

Direct Observation—Observation by direct vision, or vision aided by electronic or optical instruments. Direct observation is real-time and subject to normal line-of-sight restrictions.

Indirect Observation—Remote observation through the study of imagery either in a real-time or delayed mode.

Unattended Ground Sensor—Any sensor, exclusive of those mounted on aerial platforms, designed primarily for automatic operation and remote monitoring. (see AR 310-25 for definition of sensor).



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